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February 27, 1950

STEEL

FEB 27 1950

The Magazine of Metalworking and Metalproducing

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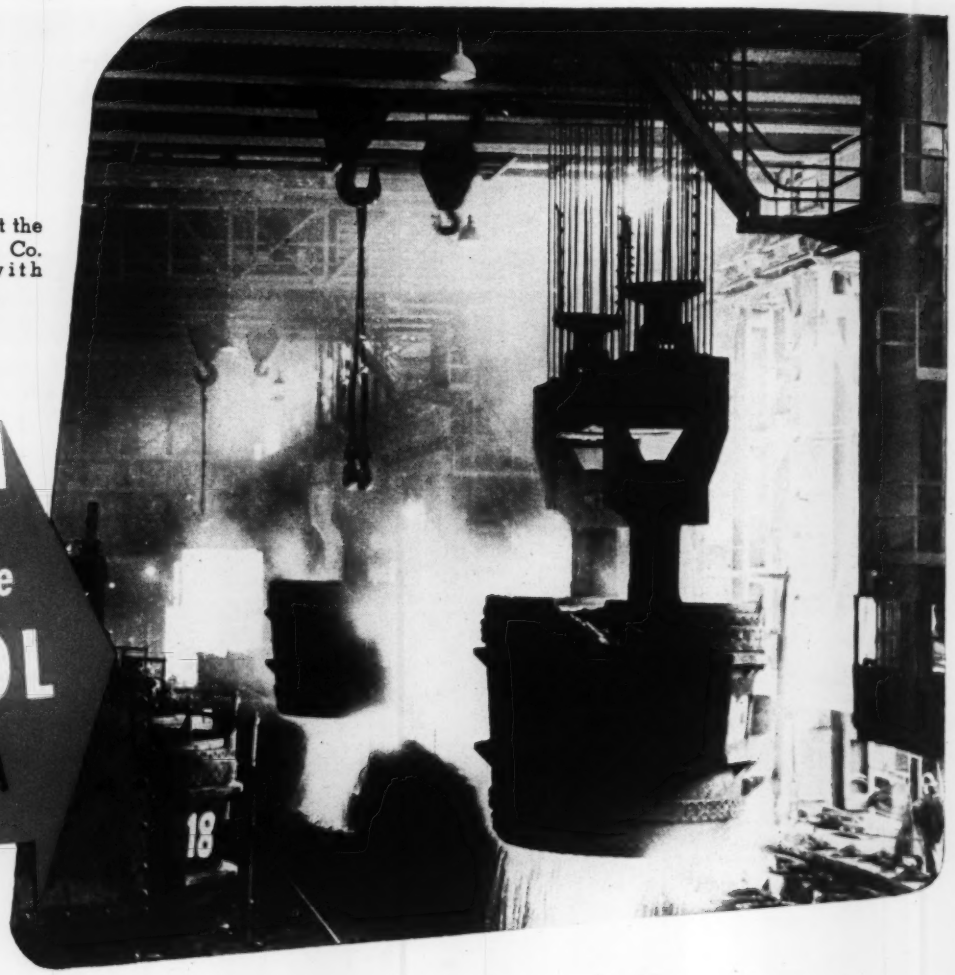

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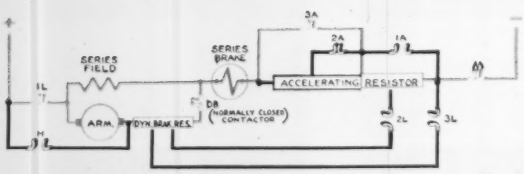

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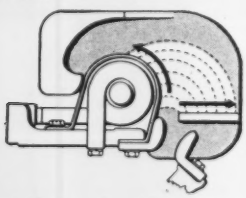

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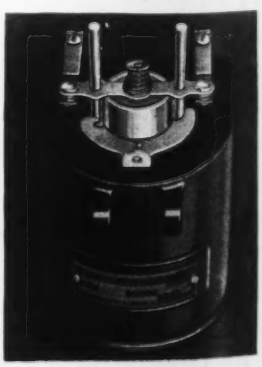

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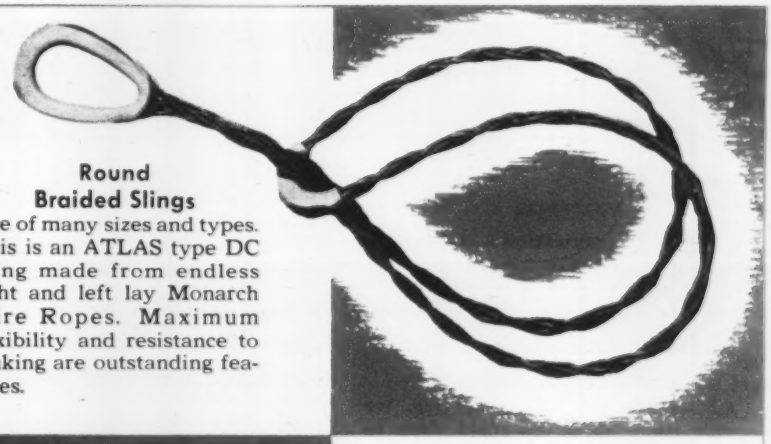

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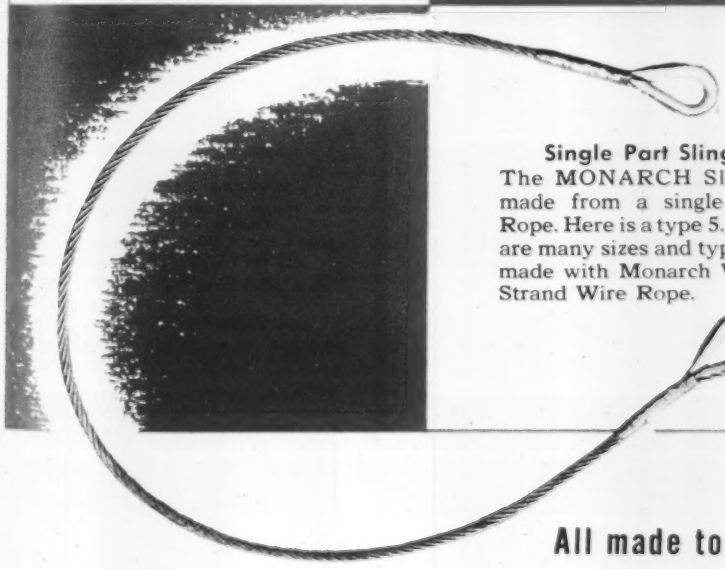

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Behind the Scenes...

Engrossed

One of this publication's loyal readers—all right, it was Associate Editor Walt Toerge — got so engrossed in STEEL the other evening that he rode three stops past his normal bus halt, and had to walk a mile and a half to get home.

As soon as we heard of this, we rushed right up to the ninth floor to interview the man.

"Listen," grinned Walt, "you're about the tenth guy up here to razz me about that. I'm sorry I ever mentioned it."

We told him we weren't going to razz him. We were seeing him in the interest of pure scientific inquiry. We asked him what issue he was reading and what stories. Walt was reading the Feb. 20 book. He figures that at the time he should have been leaving the bus he was studying the article on diversification of product lines by machinery builders on page 74. Just before that he was reading about revamped production facilities at Wheatland Tube Co. on page 85.

That machinery story is what the boys upstairs call a "synthesized job." Ed Birkner got one part of it in Cleveland. Joe Sullivan got another part in Pittsburgh. Walt Campbell got more in Toledo. The result: One story showing a trend among machinery builders. The Wheatland story is by Dan Reebel. He took the photographs, too.

Walt Toerge has been on STEEL nearly four years now. He spent more time than he cares to remember in Army ordnance. He has worked for Jones & Laughlin Steel Corp. and is a graduate of Pittsburgh University.

Step Aside, Paul

The Old North Church and Paul Revere's home, long supreme as goals for Boston tourists, have competition.

Sightseeing busses have changed their routes to pass Brink's Inc. headquarters on Prince St.

He Reads the Ads

A man after our own heart is Leon Markel of Duart Mfg. Co. Ltd. He reads the ads.

He writes: "I wish to express gratitude for the suggestions in your magazine. As a result of one ad, we were able to step up our slitter production 100 per cent. Another page showed us how to save 67 per cent of our assembly costs, another effected a 25 per cent reduction in steel requirements and we were also gratified in a 66 per cent longer life in our vee belts. Because of these economies, we are faced with an appalling surplus which we would like to invest profitably. Do you know or could you recommend a conservative investment returning about 15 to 20 per cent?"

The answer to that question is easy, Mr. Markel. Buy an ad in STEEL. The return is excellent.

Our Own Business Trend

The pages to the east of here have nothing on us when it comes to evaluating business trends. We've just spotted a trend that has terrific significance. A department store in Cleveland is trying to unload its merchandise with a big sale. Among the items on the block is red ink—prices slashed from 25 cents to a nickel a bottle.

Puzzle Corner

In the problem of Feb. 6 about the age of Ike and the monkey, Ike is 63 and the monkey 37. Submitting correct answers to that one were George S. Bond of P. R. Mallory & Co. Inc., Ralph Pappenheimer of Specialty Device Co., D. A. Cotton, of Anderson, Ind., Herman Albertine of Adams Grease Gun Corp., E. J. Sampson of Brockton, Mass., Bernard Ford of Tobe Deutschmann Corp., Jim Elmore of SKF Industries Inc., James C. Bramham of Meadows Mfg. Co. and Arthur C. Thompson of Koppers Co. Inc.

The answer to the problem of Feb. 13 about the double-track trolley line is: The sweeper walked at 4 miles per hour. The trolleys went at 10 miles per hour. When we went to press, no one had sent in the correct answers to this.

Whet your puzzle appetite on this one. For their common meal Joe provided seven sandwiches and Mike eight. But Jake arrived unexpectedly, so all the food was shared equally. Jake paid Joe 14 cents and Mike 16 cents for his share of the meal. Mike complained about this division, and the matter was referred to a judge. What should the judge's decision be, granting that 30 cents is the correct total amount?

Shrdlu

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STEEL

Vol. 126—No. 9 February 27, 1950

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Published by

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Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1950 by the Penton Publishing Company.

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STEEL

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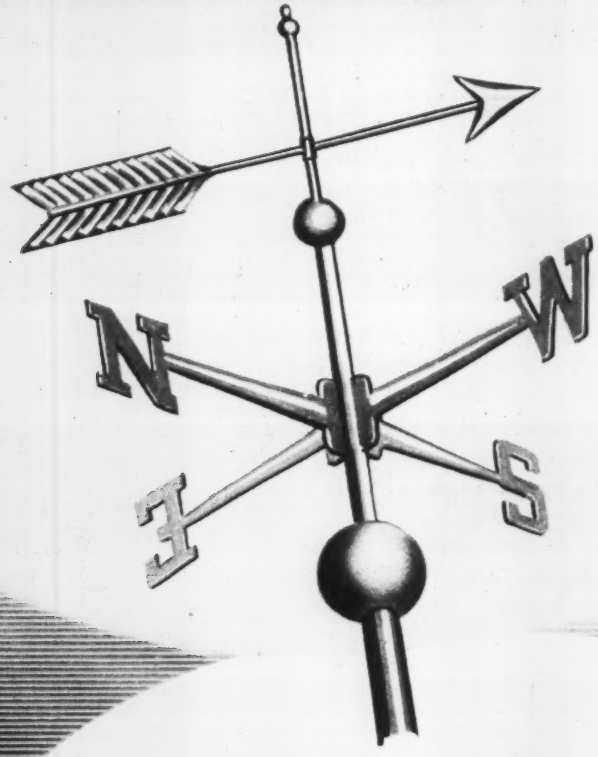

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RM-27

February 27, 1950

Buying Habits Change

A major characteristic of the American economy is that the nation's needs for materials, manufactured products and services are changing constantly. It is safe to say that buying habits here shift more rapidly than those of any other industrial country in the world.

These changes are reflected in the problems of the basic industries. In the steel industry, for instance, there is a constant necessity of modifying rolling mill and finishing facilities to the latest buying practices of customers. The change has been rather startling ever since the beginning of World War I.

Before that conflict, the emphasis in steel demand was on the so-called "heavy" products such as rails, plates, shapes and bars. For illustration, in 1916, about 54 per cent of all finished steel distributed was in the form of rails, plates, shapes and bars. In 1939, just before World War II, these four products accounted for only 29 per cent of the steel. In 1949, for which year statistics now are available, the corresponding figure is 30 per cent.

Off-hand one would say that this long-term drop in the consumption of the heavy products has been compensated for by a sharp rise in the lighter products such as flat-rolled steel. This is partly true, but it isn't the complete answer. A more realistic explanation may be found in a comparison of finished steel consumption for the years 1939 and 1949.

This shows minor to moderate declines in rails, shapes, wire products, tin plate and strip and rather impressive gains in plates, bars, pipe and sheets. This would indicate that the shifts in the past decade have not been as much from heavy to light products as they have been to forms of steel—heavy or light—which are most ideally adapted to present day needs, designs and methods of manufacture.

Mass production techniques have affected consumption of bars, pipe and sheets. The rise of pipeline distribution and of the chemical and processing industries has affected the demand for plate and pipe. It is not unlikely that developments now under way will change the finished product "mix" of the mills more drastically in the decade of the fifties than did altered habits of demand in the forties.

* * *

BILLION DOLLAR LOSS: In this issue the editors introduced improvement and expansion of the long established Business Trend section. All regular charts, tables and text are retained but in somewhat different format. In addition, current news pertaining to "business weather," which heretofore appeared forward in the news pages now appear in the third and fourth pages of the 4-page Business Trend section.

We believe readers will find the new arrangement convenient in that statistics and charts showing what has gone on in the past now are presented along with "business weather" items which give clues as to what is happening currently or will happen in the future. In short, the past, present and future trends of business are wrapped up in a single package.

Noteworthy in this week's section is the extent to which favorable trends are offset by losses caused by the coal and Chrysler strikes. For example, the index number of new machine tool orders in January hit the highest point recorded since August, 1946. Against the favor-

(OVER)

able impact of this and other encouraging indexes are the serious potentials of the strikes. Thus far in 1950 coal miners have lost $146 million in wages and the operators have lost $240 million in sales. Chrysler employees and employees of suppliers have lost $36 million in wages and Chrysler and dealers have lost $186 million in sales. Here alone are losses of $608 million. Adding obvious indirect losses could easily bring the total to a cool billion dollars.

—pp. 46-49

* * *

FAST GROWING INDUSTRY: Manufacture of coin-operated machines seems to be a rapidly growing business. In fact it is not one business but three—vending or dispensing machines, amusement devices and gambling machines.

Most important to the metalworking industries is the first named—vending or dispensing machines. Authorities estimate that today from $1 to $1.5 billion worth of merchandise is sold annually through coin machines. Three years ago sales were about $500 million.

The 1947 Census of Manufactures says the vending machine industry consists of 84 companies, 45 of which list vending machines as their primary product. Annual production was valued at $43,205,000, of which refrigerated coin-operated bottled beverage dispensers accounted for $25 million and cigaret dispensers for $5.5 million. Merchandisers declare the industry has barely scratched the surface of opportunities for extending sales through the use of coin machines.

—p. 33

* * *

MORE HOUSES STARTED: Metalworking companies whose products go into homes should be encouraged by the almost spectacular activity in home construction thus far in the new year. Bureau of Labor Statistics reports that builders started 80,000 new nonfarm dwelling units in January. This was an increase of 1000 units over December and of 30,000 over January, 1949. Telegraphic checks on local building permits issued in January indicate that housing starts in February also may be at an unseasonally high level. January was the seventh consecutive month in which homebuilding showed an increase over the same month in the previous year.

Continuance of this pace will call for at least a moderate revision of estimates of the 1950 market for materials, equipment and appliances in new homes. At the turn of the year, authorities were expecting that house construction in 1950 would be good, but not up to that of 1949. In the light of January starts and the outlook for February, perhaps the earlier estimates were conservative.

—p. 35

* * *

STEEL IN 12 MINUTES: Producers and consumers of steel are vitally interested in the turbo-hearth process on which experiments are being conducted by Carnegie-Illinois Steel Corp. and Battelle Memorial Institute. The special process consists of surface blowing charges of hot basic iron in a basic-lined hearth in a vessel similar to a bessemer converter. It is said the process is capable of making steel of open-hearth quality in 12 minutes without using external fuel.

Latest developments of significance are that 15 commercial scale heats made at South Works of Carnegie-Illinois, cast as ingots, rolled into plates and subjected to numerous tests indicate that steels produced by the special process are equivalent to normal open-hearth steels of similar composition. The South Works commercial scale heats tend to confirm in practically all details the results of earlier experimental heats poured at Battelle.

Apparently the process has been proved chemically sound and metallurgically feasible, but much remains to be done to establish it on a commercial basis.

—p. 72

* * *

MARKET OF THE FUTURE: If social, political and economic conditions in the United States at some future time should result in the development of an economical method of converting coal into liquid motor fuel, an interesting new market for special machinery would be created. Experience at the Bureau of Mines coal-hydrogenation demonstration plant at Louisiana, Mo., indicates that commercial plants would require specially designed high-pressure vessels, converters, preheaters, heat exchangers, pumps, high-pressure tubing, flanges, fittings, valves and numerous other items.

Also possible would be adaptation of a German process of fabricating high-pressure vessels by winding layer after layer of strip steel in a special lathe to form a laminated-wall vessel of high strength. Use of corrosion-resistant material would be reduced because only the inner layer would require properties of this nature.

—p. 36

E. L. Shaner

EDITOR-IN-CHIEF

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News Summary

COAL—Industrial production will sag still more this week if normal coal operations aren't resumed in the next few days (p. 29). Steel ingot operating rate is above 75 per cent of capacity, but steel supplies are tightening. Power shortages are not yet widespread although Pittsburgh has been hit. Gas consumption by industrial users has skyrocketed. Most gas companies can meet the demand as long as the mercury doesn't drop below 15 degrees above zero. Oil supplies are adequate, but transportation is not. Curtailed rail freight service is slowing up some petroleum deliveries.

STEEL SUPPLY OUTLOOK—Coal darkens the short-term steel supply situation, but how are prospects for the long run? Pretty good, judging from moves by four steel companies which are polishing up their sales forces (p. 29). Through meetings and plant tours U. S. Steel Corp., Bethlehem Steel Co. and Allegheny Ludlum Steel Corp. are briefing their sales personnel on new trends. Lukens Steel Co. is expanding its sales force.

STEEL DISTRIBUTION—Changes in steel distribution patterns are shown in yearend summaries by American Iron & Steel Institute (p. 32). Ingot production for conversion deals has just about dried up. Booming auto and construction industries are bolstering the steel industry's high production performance. One of the sharpest drops in steel consumption was in freight cars.

VENDING MACHINES—Metalworking has an increasing stake in a growing industry: Vending machines (p. 33). More than 80 companies make over $43 million worth of "silent salesmen" yearly; the total is mounting. Vending machines annually sell between $1 billion and $1.5 billion worth of candy bars, cigarets, beverages, electric shaves, even fresh fishing bait. Three years ago the figure was about $500 million.

HOUSING—Expect a sales lift from the housing boom (p. 35). If you make home appliances, plumbing fixtures, furnaces or anything else that goes into a new house, note that nonfarm dwelling starts were at an alltime high for January—80,000. February will be high, too, and the whole year promises to be a record-breaker.

COAL-HYDROGENATION—Bureau of Mines' project to develop a good method to convert coal into liquid motor fuel may ultimately mean a large market for special machinery (p. 36). The equipment will have to be fabricated largely from steels capable of meeting severe operating conditions. If your're looking for fabricating tips, get the bureau's booklet on "Report on Investigations 4584; Special Equipment in the Coal-Hydrogenation Demonstration Plant."

BUSINESS WEATHER—The coal and Chrysler strikes are clouding the long-term economic outlook (p. 48). In early January, prospects looked good for a near-record first half in nearly all metalworking lines. Not now. Miners so far in 1950 have lost $416 million in wages. Chrysler employees and supplier workers laid off because of the auto strike have lost $36 million to date. Aside from this loss in national purchasing power, coal sales thus far in 1950 are $240 million under what they were for the comparable period last year. The 150,000 automobiles that haven't been built would have given Chrysler about $186 million in sales.

HERE AND THERE IN INDUSTRY—Gross national product declined to $257.4 billion in 1949 from $262.4 billion in 1948 (p. 49). . . . Clock manufacturers expect 1950 production nearly to equal the record 1948 level when an estimated $117 million worth of clocks and clock parts were made (p. 34) . . . New Kaiser-Frazer Corp. line was well received at a Chicago auto show (p. 43) . . . Western Europe's power shortage is being solved with large scale power expansion program, particularly in France and Italy (p. 40) . . . The mill pricing system in steel is one of the reasons why Caterpillar Tractor Co. will build a new plant near Joliet, Ill., and the Chicago producing area (p. 31).

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STEEL
A PENTON PUBLICATION

Industry Output Slips Still More

Metalworking companies face increasing scarcities in steel, power, gas oil and transportation if normal coal mining operations aren't resumed this week

COAL users are mining their own fuel now—from the bottom of the bituminous stocks.

Industrial production will sag still more this week, if normal mining operations aren't resumed in the next few days. Besides a scarcity in coal itself, metalworking this week faces the possibility of increasing shortages in steel, power, gas, oil and transportation.

Steel Rate High — The national steelmaking rate is still above 75 per cent of capacity. Steelmakers have about used up their bag of tricks to consume less coal and still keep rolling mills going full tilt. Effects of declining blast furnace output are filtering down to hit rolling schedules.

While a few metalworking companies are already down to 60 per cent of capacity for lack of steel, industry generally is not yet in as tight a spot. Steel mills report that demand is high, but it has been that ever since last summer. Sheets and pipe are especially hard to get, but they were difficult to obtain even before the coal strike. Warehouse sales are up a little because steel users who normally buy direct from the mill can't get all they need from that source. Most automakers have had to give up Saturday shifts. Some steel destined for the strike-bound Chrysler plants is being diverted to other members of the auto industry.

Power Cutbacks—A power shortage could be as serious as a steel scarcity. Principal electricity cutback thus far has been by Duquesne Light Co., Pittsburgh. It asked 44,000 commercial and industrial customers to curtail their use of power by 20 per cent on week days. Electrical energy distributed by the power industry is averaging 6 billion kwhr weekly in February; averaged 5.9 billion kwhr weekly in January and 5.8 billion kwhr weekly in December. The rise is accounted for partly by higher utility sales to companies that normally generate much of their own electricity but are now buying from the outside to save coal. Most utilities still have at least a two weeks' supply of coal. They're skimping on coal by using standby facilities.

Oil and Gas—Most gas companies

NEA

MINING COAL
. . . from bottom of stockpiles

are operating on a day-to-day basis. Because of the coal shortage, East Ohio Gas Co. is selling more gas now than at any other time in the past 50 years. It can meet the huge demand as long as temperatures remain above 15 degrees above zero. Most other gas companies are in the same position. Oil supplies are adequate, but transportation is not. There's enough oil, but the curtailed rail service can't haul it fast enough. If the miners stay out, this situation will worsen.

Transportation — Another problem for metalworking is transportation, from the standpoints of both its own freight needs and oil. Railroads have an eight to ten days' supply of coal. The 25 per cent curtailment in rail freight service using coal will be sharper if coal operations aren't resumed this week.

Steel's Coal Needs High

More than 200 tons of coal every minute of the night and day during an entire year—that is what the steel industry would require at full production with its present record capacity of 99,392,800 tons of ingots, says American Iron & Steel Institute.

The coal requirements would total 109 million tons, enough to supply each coal-heated home in the country with five tons of fuel. At that rate the steel industry would use nearly one-quarter of the amount of coal produced in 1949, or almost twice the proportion it has used in recent years.

Less Lake Coal Shipped

Lake coal shipments by M. A. Hanna Co., Cleveland, dropped 39 per cent in 1949 to 6,857,000 tons, compared with 11,234,000 tons a year earlier. The company's anthracite coal output was down 23 per cent to 2,063,000 tons from 2,691,000 in 1948.

Hanna-operated ore fleet handled 11,673,000 tons of iron ore in 1949, compared with 11,828,000 tons in 1948.

What's Steel Outlook?

Long-term supply prospects good, judging from steel firms' actions to boost sales forces

WHAT'S the long-term outlook on steel supplies? Excellent, judging from actions by four steel companies. U. S. Steel Corp., Bethlehem Steel Co. and Allegheny Ludlum Steel Corp. are all briefing their salesmen with meetings and tours. Lukens Steel Co. is expanding its sales force.

First Meeting since 1938—American Steel & Wire Co. last week in Chicago held its first sales meeting since 1938. Similar gatherings are scheduled for Cleveland and New York. In Chicago salesmen were told to forecast customer needs, gather market information at grass roots levels and keep an eye on such factors as the birth rate and product design trend. Clearance T. Gilchrist, western area manager for sales, conducted the meeting and stressed that customer service is the best way to obtain new customers and satisfy the old.

Presentation of a stainless steel shovel to Los Angeles district for the best job of "digging" for sales in 1949 featured the annual meeting in Chicago last week of district managers, department heads and assistants of U. S. Steel Supply Co., another U. S. Steel subsidiary. Speakers were Leslie B. Worthington, president of the supply company; Bennett S. Chapple, assistant vice president of sales, U. S. Steel Corp.; and Bay E. Estes, director of commercial research, U. S. Steel Corp. Mar-

cus J. Aurelius, sales vice president of the supply company, was chairman of the meeting.

Bethlehem Tours—Bethlehem Steel Co. is conducting a series of plant visitation tours for sales and other personnel. Eight tours cover plants in Bethlehem, Johnstown, Williamsport and Steelton, Pa., Lackawanna, N. Y., and Sparrows Point, Md. This is the first time Bethlehem has organized a plant visitation program of this type.

Regional Meetings—Allegheny Ludlum Steel Corp. has conducted a series of regional sales meetings in Chicago, Pittsburgh and New York. Purpose was to acquaint district sales representatives with new capabilities of the company to produce a wider range of products as a result of the $28 million postwar plant improvement program.

Lukens Expands Sales Efforts — Lukens Steel Co. is adding increased emphasis to its sales promotion and advertising efforts to stimulate business. It has additional sales representation in Denver and Birmingham. On Mar. 1 it will open a regional office in Houston and Apr. 1 it will establish a district office in Los Angeles.

Steel Castings Output Up

Volume of steel casting production is improving materially. Prospects are for increased manufacturing operations over the next few months.

The optimistic outlook was expressed at a regional meeting in New York of Steel Founders' Society of America. Industry executives base their prediction on renewed buying of durable goods and revival of advance orders for railway equipment. The latter normally constitutes a comparatively heavy percentage of the industry's tonnage.

Importance of research was emphasized at the meeting as a means of reducing production costs, improving quality and providing foundrymen with valuable market and production data. Steel Founders' Society has thus far spent more than $200,000 on research projects. Conservative estimates indicate potential savings to the industry of between $2 million and $8 million, depending on the extent to which the research findings are actually applied to production and sales problems by individual foundries.

Pullman's Backlog Growing

Orders for 4300 freight cars since the first of the year are reported by Pullman-Standard Car Mfg. Co., Chicago, Pullman Inc. subsidiary. This number represents a sizable gain over all 1949 when only 1700 cars were booked.

Several large inquiries for freight cars are out and may bring in additional orders in the next few weeks. The company expects an upswing in ordering to continue as railroads come into the market for cars after the coal strike is settled.

The pickup in car buying will not be reflected in Pullman-Standard shipments until the second quarter. Steel supplies are so tight, the company says, that work will not start on these cars until April.

Pullman's other major subsidiary, M. W. Kellogg Co., producer of petroleum and general chemical processing equipment is maintaining a fair level of production and sales but its profits have been restricted by heavy development and research costs.

Cold Metal Installs Mill

COLD Metal Products Co. is installing a new cold strip mill at Youngstown to do jobs too tough for standard Steckel cold rolling mills to handle.

The mill is equipped with small work rolls only three inches in diameter. It can roll strip down to 0.00[illegible] of an inch, and will be used particularly for stainless, silicon and high carbon steel strip which because of brittleness break easily on ordinary mills. General Electric Co. is supplying the electrical equipment for the unit (see STEEL, Feb. 13, p. 58).

Cold Metal will have eight cold strip mills in its plant when this one is finished. It makes strip for feeler gages, tape measures, razor blades, shims, gaskets, springs and other purposes. The company is affiliated with Cold Metal Process Co. that developed the Steckel mills.

Newport Steel Sells Division

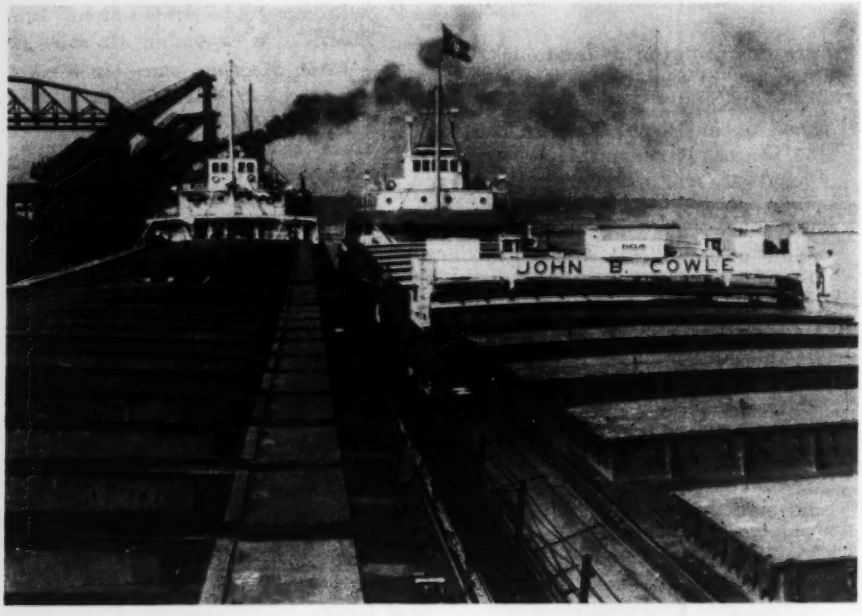
ROMOS Enterprises, Cincinnati, bought the Aircraft Tool Division at Elkhart, Ind., of Newport Steel Corp. Price is $1,170,000.

The Elkhart factory will continue in production under the name of Elkhart Machinery Corp.

Republic Pension Plan Approved

REPUBLIC Steel Corp.'s stockholders have approved a pension plan that will cover substantially all the corporation's employees.

Of the stock voted, 96.5 per cent approved the pension plan and the rest disapproved. The pensions payable to union members in accordance with the labor agreement of Nov. 1, 1949, are included in this plan which goes into effect Mar. 1, 1950. Employees reaching 65 and having 25 years or more of service with Republic may retire and receive a minimum pension of $100 a month.



TIME AND TEDIUM ELIMINATED: The ore carrier at right is equipped with a self-powered Euclid hatch cover gantry crane, jointly designed, built and installed by Euclid Crane & Hoist Co., Euclid, O., and American Ship Building Co., Cleveland. The crane makes possible rapid removal and replacement of huge one-piece steel hatch covers. The covers can be moved or put into place in less than 30 minutes, thus eliminating a good deal of time, labor and hazard. The ships can carry more ore because of the added safety factor: Sealed hatches keep out water

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Caterpillar To Build

Decentralization, mill pricing system, proximity to suppliers among reasons for Joliet site

THE MILL pricing system in steel is one of the reasons why Caterpillar Tractor Co. will build a new plant near Joliet, Ill., and the Chicago producing area.

Construction to cost "several million dollars" will start immediately. The plant will have facilities to make bulldozers, scrapers, wagons and rippers. It will have about 700,000 sq ft of space and 1200 people will be employed. Caterpillar has bought 300 acres of land along U. S. Highway 6 and on the Des Plaines river part of the Illinois waterway.

Facilities will include a modern steel fabricating and assembly plant, an office building, a heating plant and a sewage and water treatment plant. Louis B. Neumiller, company president, says that because of inadequate space only a few component parts have been manufactured in the Peoria, Ill., plant despite addition of 2 million sq ft of floor area.

Final assembly operations of tractor components will start in the Joliet plant even before the buildings are completed and fabrication machinery is installed. Another factor that led to the decision for a Joliet plant, says Mr. Neumiller, was decentralization: Caterpillar products are important to the military.

T. R. Farley, company vice president, will be general manager of the new plant. The Joliet site is near major steel suppliers, railroads, highways and the Illinois waterway with barge service to Peoria.

Osborn Buys Adjoining Plant

OSBORN Mfg. Co., manufacturer of brushes for industry, bought the four-story building adjoining its Cleveland plant.

The building, formerly owned by Leece-Neville Co., producers of electrical equipment, contains 77,600 sq ft of floor space. It gives Osborn a 30 per cent increase in production space. Purchase price was $200,000. The building will house the technical department and contain all machines, tools and laboratories needed to supply technical service to industry.

Alcoa Forming New Division

ALUMINUM Co. of America will soon establish a new division for the rolling of magnesium sheet at its New Kensington, Pa., works.

Alcoa says that it will set up this division because of the "greatly increased demand for magnesium sheet in airplane construction and other phases of the national security program."

In past years Alcoa had rolled this product at New Kensington, but after the end of World War II demand for it dropped and the operations were discontinued. Sufficient orders now have been received to enable the company to establish the operation on a developmental basis. The new division will employ about 100.

Alcoa says that with improved productivity and modern production techniques "additional orders may eventually be forthcoming for magnesium sheet and the size of the operations increased."

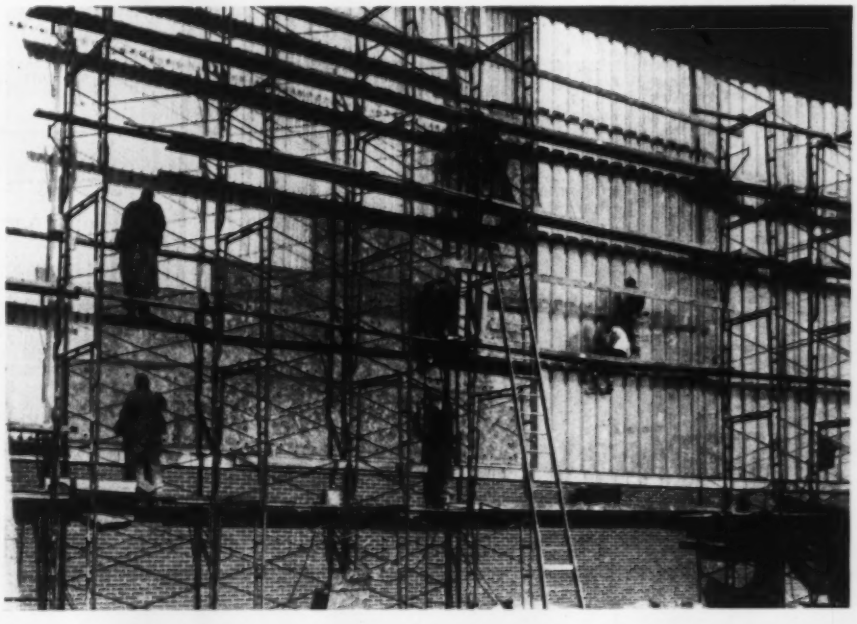
Columbia Buys Lakes Vessel

COLUMBIA Transportation Co., Great Lakes vessel firm, has purchased the self-unloader vessel, *Sierra*, from Sierra Transportation Co.

This increases Columbia's self-unloader fleet to seven units. The rest of its fleet consists of eight bulk carriers and five crane-equipped, self-loading and unloading vessels. The *Sierra* was converted from a bulk carrier to a self-unloader in 1929. The five compartments of the vessel have a capacity of about 7500 net tons. Winter work will proceed immediately to have her in top operating condition for the opening of navigation this year.

Acquisition of the *Sierra* is another move by Columbia to develop a diversified fleet. American Shipbuilding Co. is converting its *W. C. Richardson* from a bulk carrier to a crane vessel in Chicago.

Lincoln Plant Gets "Breathing" Walls



THREE STAGES in the erection of the "breathing" steel-Fiberglas-aluminum sidewall, being used by the Austin Co. to enclose the new 850,000 sq ft plant that it designed for Lincoln Electric Co., Cleveland, are shown above. The inner wall is composed of 1¾ inch deep steel panels (Ferroboard) extending from the brick and limestone sill wall to the roof line. They are attached to girts at the sill line and parallel to the top and bottom chords of the trusses by arc and stud welded fasteners.

A bar, arc welded to the outside of the inner wall, midway between the sill and truss, carries an additional row of Nelson studs. They are used to secure the long aluminum facing panels; 10-gage headless welding pins are stud welded to the Ferroboard to support the Fiberglas insulations (center of picture) which is held in place with speed clips.

The 3½ inch deep aluminum box sections, 15 inches wide, that serve as exterior facing are then installed. They are fastened to the sidewall by special aluminum transition nuts, developed by Truscon Steel Co. and Aluminum Co. of America engineers.

The Lincoln wall has a vapor seal on the inside between the inner Ferroboard panels and the Fiberglas insulation so that the Fiberglas insulation is between the outside atmosphere and the vapor seal. The principles of the wall were first introduced by Austin at the huge Ft. Worth Army assembly plant where Consolidated Vultee is currently producing B-36s.

Easing in Steel Demand Alters Product Mix

CHANGES made in steel distribution patterns because of easing in pressure last year for steel deliveries are reflected in the American Iron & Steel Institute's yearend reports.

Conversion Deals Fade Out—As the overall demand for steel declined during 1949 and finished steel became more easily obtained, the purchase of ingots for conversion through special arrangements sloughed off; the result was tonnage of the classification of ingots, blooms, slabs, billets, tube rounds, and sheet and tin bars amounted to 3.9 per cent of the steel industry's 1949 shipments. In 1948 the percentage was 4.8.

Although some consuming groups reduced their steel purchases the record-breaking production of the automobile industry helped take up the slack; so mill shipments of cold-rolled sheets rose and amounted to 6,886,946 net tons, or 11.8 per cent of all steel shipments of 58,104,010 net tons in 1949.

Aided by Construction—High level of activity in the construction industry helped account for an increase in mill shipments of hot-rolled reinforcing bars to 1,572,588 tons.

Sharp contraction of railroad freight car demand and production is partly responsible for the drop in proportion of plates from 10.6 per cent in 1948 to 9.9 per cent in 1949.

1949 Product Shipments—All Grades

Steel Products	Number of companies	Net Shipments* (Net Tons)	Per cent of Total Shipments
Ingots, blooms, slabs, billets, tube rounds, sheet and tin bars, etc.	47	2,261,285	3.9
Skelp	6	118,533	0.2
Wire rods	21	570,397	1.0
Structural shapes (heavy)	11	3,669,503	6.3
Steel piling	4	301,824	0.5
Plates	28	5,759,065	9.9
Rails—Standard (over 60 lbs.)	4	1,772,734	3.0
Rails—All other	5	117,154	0.2
Joint bars	7	118,559	0.2
Tie plates	6	373,337	0.6
Track spikes	8	95,345	0.2
Wheels (rolled or forged)	5	285,733	0.5
Axles	5	159,628	0.3
Hot rolled bars (including light shapes)	40	6,416,102	11.0
Hot rolled bars—Reinforcing	24	1,572,588	2.7
Cold finished bars	33	1,213,052	2.1
Tool steel bars	17	57,395	0.1
Pipe—Standard	17	2,090,445	3.6
Pipe—Line	14	2,534,423	4.4
Pipe—Oil country goods	14	1,365,982	2.3
Tubes—Boiler	3	107,970	0.2
Tubes—Mechanical and pressure	21	617,663	1.1
Miscellaneous pipe (including conduit)	12	218,737	0.4
Wire—Drawn	38	2,138,878	3.7
Wire—Nails and staples	17	731,356	1.3
Wire—Barbed and twisted	15	215,047	0.4
Wire—Woven wire fence	13	358,162	0.6
Wire—Bale ties	12	42,828	0.1
Black plate	10	452,041	0.8
Tin and terne plate—Hot dipped	10	1,699,355	2.9
Tin plate—Electrolytic	10	1,993,468	3.4
Sheets—Hot rolled	28	6,192,610	10.7
Sheets—Cold rolled	16	6,886,946	11.8
Sheets—Galvanized	15	1,755,067	3.0
Sheets—Long terne	9	151,118	0.3
Sheets—Enameling	8	162,815	0.3
Sheets—Electrical	11	379,180	0.6
Strip—Hot rolled	24	1,674,818	2.9
Strip—Cold rolled	35	1,465,297	2.5
All other	3	7,570	..
Total steel products	138	58,104,010	100.0

As reported to the American Iron and Steel Institute.
* Excluding shipments for further processing or resale.

1949 Shipments—Tool Steel Bars

(Excluding Hollow Drill Steel)

Grade	C (Min.)	Cr (Max.)	W (Max.)	Mo (Max.)	V	Co	Shipments (Net Tons) To Date This Year
Class A High Speed Steel							
I	0.60	4.5	6.0	5.5	1.9 Max.	0.0	2,540
I-b	0.90	4.5	6.5	6.5	2.25 Min.	0.0	104
I-c	0.60	4.5	6.0	5.5	2.2 Max.	3.5 Min.	208
II	0.60	4.5	1.8	8.75	1.3 Max.	0.0	560
II-c	0.60	4.5	1.8	8.75	2.2 Max.	3.5 Min.	26
III	0.60	4.5	—	8.75	2.2 Max.	0.0	151
III-c	0.60	4.5	—	8.75	2.2 Max.	3.5 Min.	29
Total							3,618
Class B High Speed Steel							
IV	0.55	4.5	19.0	0.0	1.2 Max.	0.0	4,041
IV-b	0.55	4.5	19.0	1.1 Max.	2.0 Min.	0.0	591
IV-c	0.55	4.5	22.0	1.1 Max.	2.2 Max.	3.5 Min.	804
Total							5,316
Other Tool Steels							
V	All hot-work steel						5,140
VI	High chromium (4% Cr minimum) die steels						4,107
VII	All other alloy tool steels						26,251
VIII	Carbon tool steels, excluding hollow drill steel						12,968
Total							49,066
Grand total							58,000

1949 Production of Stainless Steel Ingots

Net tons—All Types Except Types 501 and 502

Type Number	Ingot Production	Type Number	Ingot Production	Type Number	Ingot Production
301	34,144	321	5,306	430	122,286
302	93,666	347	24,052	430F	921
302B	515	403	5,526	431	1,157
303	9,189	405	2,156	440A	1,334
304	68,996	406	1,621	440B	592
308	1,972	410	15,961	440C	873
309	2,647	414	2,165	442	298
310	4,528	416	9,285	443	4
316	19,119	420	3,315	446	2,321

All Other Types 13,076
Total All Types 447,025

As reported by 20 companies, which in 1948 represented 98.9% of the total output of stainless steel ingots as reported to American Iron and Steel Institute.

1949 Stainless, Alloy Steel Shipments

(Net Tons)

Stainless Products	Total Shipments	Export	Shipments to Members*
Ingots, blooms, billets, slabs, sheet bars, tube rounds, etc.	55,739	1,289	39,447
Plates	8,718	810	48
Sheets—Hot Rolled	20,250	942	4,735
Sheets—Cold Rolled	55,056	7,953	276
Strip—Hot Rolled	17,376	70	11,635
Strip—Cold Rolled	106,545	2,261	1,473
Bars—Hot Rolled	20,705	562	1,053
Bars—Cold Finished	17,941	152	13
Pipe & Tubes—Mechanical	2,549	368	11
Pipe & Tubes—Pressure	3,968	279	163
Pipe & Tubes—Miscellaneous	993	49	.....
Wire Rods	368	82	7
Wire—Drawn	15,889	195	193
All Other (Incl. Structural Shapes)	634	28	.....
Total Stainless Steel	326,731	15,040	59,054
All Products—4% to 6% Chromium (Types 501 and 502)	10,600	1,084	2,072
Alloy Products (Excluding Stainless Steel and Types 501 and 502)			
Ingots, blooms, billets, slabs, tube rounds, sheet bars, etc.	432,434	1,462	58,284
Structural Shapes (Heavy)	40,606	931	.....
Steel Piling	18	....	.....
Plates (Sheared & Universal)	153,986	3,500	766
Rails—Standard (Over 60 lbs.)	120	5	.....
Rails—All other	55	2	.....
Bars—Hot Rolled	1,581,044	15,776	121,300
Bars—Cold Finished	176,964	1,061	3,544
Bars—Tool Steel	45,032	920	524
Pipe & Tubes—Oil Country Goods	201,851	18,337	3,829
Pipe & Tubes—Mechanical Tubing	120,299	3,064	1,462
Pipe & Tubes—Pressure Tubing	34,024	3,272	1,830
Pipe & Tubes—Miscellaneous	4,201	7	6
Wire Rods	10,488	28	2,407
Wire Drawn	26,788	27	502
Sheets—Hot Rolled	446,939	41,004	676
Sheets—Cold Rolled	223,239	7,002	29
Strip—Hot Rolled	58,729	153	4,375
Strip—Cold Rolled	66,861	3,163	21
Wheels (Car, Rolled Steel)	93	....	.....
Axles	550	....	.....
All Other	3,162	1	.....
Total Alloy Products	3,627,483	99,715	199,555

During 1948 the companies included above represented 99.9% of the output of stainless, and 98.3% of the output of alloy other than stainless, finished rolled steel products as reported to American Iron and Steel Institute.

* To members of the industry for conversion into further finished products or for resale.

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Growing Industry: Vending Machines

They'll give you a shave or fresh fishing bait. And they're taking more metals. Their annual production has been valued at $43 million

COIN-OPERATED machines hold a fascination for everybody—from the kid who waits with bated breath while a penny's worth of peanuts pour into his hand to the ever-hopeful sucker who expects someday to hit the jackpot on the slot machine.

From a metalworking viewpoint, coin machines are equally fascinating. They require ingenious design, skillful production methods and consume substantial quantities of ferrous and nonferrous metals and alloys.

Often thought of as a single industry, it actually is three: Vending, amusement and gambling. Each has its own trade problems, business expectation, legislative hurdles. Each has its own trade association.

Mechanical Vending Growing—"Comer" from the metalworking standpoint is the vending machine industry, it now being credited with serving up to the public 17 per cent of its cigarets, possibly a like percentage of its soft drinks, and maybe 10 per cent of its candy bars.

The sales through machines are astronomical. National Automatic Merchandising Association says that 325,000 cigaret machines sell 48,750,000 packs a week. Six hundred thousand cigars a week go into smokers' mouths from 15,000 machines. The 300,000 candy machines deliver 42 million bars a week. Bottled beverages slide down 275,000 chutes 49.5 million times a week, and 12,750,000 additional drinks per week are filled at 15,000 cup-type dispensers.

Sales Trebled in 3 Years—Conservative industry spokesmen believe that $1 billion worth of merchandise is sold annually through coin machines; some say as high as $1.5 billion. Three years ago the figure was about $500 million.

The vending machine industry's only reliable self-portrait was made late last year by a special tabulation of the 1947 Census of Manufactures. Eighty-four companies, of which 45 list vending machines as the primary products, comprise the industry.

Annual production was valued at $43,205,000, of which refrigerated coin-operated bottled beverage machines accounted for $25 million; cigaret machines at $5.5 million were next in shipment value.

A prewar comparison is offered in this tabulation giving the value of automatic merchandising machines (except coin-operated photographic apparatus, scales, refrigerated beverage and ice cream dispensers) in 1939 at $6,154,000 against $14,535,000 in 1947.

ELECTRIC RAZOR STATION

. . . ingenious design, skillful production, substantial metals

Drinks, Smokes and Food—Three machine types—beverage, cigaret and food and candy—while only nicking the surface of products which are or can be sold by "silent salesmen" make up approximately 93 per cent of vending machine makers' dollar sales volume.

This industry which seems to have attracted its full share of inventive genius believes automatic merchandising has only begun to attract consumers' coins.

Ardent proponents, for example, are going to equip drug stores with banks of machines for all packaged sundries, and by rotating the machines will enable passers-by to get their drug needs on the street after the store closes for the night. They will in time, they think, revolutionize our buying habits and in so doing persuade us to buy more. Their theory is much buying is "impulse"—that sales will mount in almost direct ratio to the convenience of the merchandise.

Need a Shave?—For the time being their imaginativeness is finding outlet in providing us with coin-in-slot electric razor stations, fresh fishing bait dispensers, insurance policy writers. You will soon be able to get from a machine electronically cooked sandwiches, which you will wash down with coffee, black, light, sweetened or not, from a neighboring machine.

Furthermore the the coin-in-slot device adds tangibly to the sales potential of any number of consumer durable goods. Look at television sales in stores where coin meters replace the installment collector. The same sales aid is being used on new automobiles—the meter accompanies the car and when time is up on one quarter another must be dropped or the carburetor gets no gas.

Manufacturers Busy—It is no wonder manufacturers are working around the clock and fighting to keep shipments from lagging too far behind orders.

The amusement device industry is having itself a good time making "shuffle alleys," a bowling game which closely simulates all the conditions of actual bowling. This is a "hot" item, and, despite its cost to operators of $325-$350, several makers are each turning out 300 or more a week. Pin ball machines, while "dead" with most makers, are being produced by one at a 700-a-week clip.

Coin Boxes Bigger—One problem for designers, which indicates well the success of present amusement devices, has been to make coin boxes large enough to hold the "take." Too

frequent emptying was increasing the service cost to operators, who own and maintain the machines.

At present no fears are expressed by Coin Machine Institute spokesmen that the amusement device makers will soon saturate their market as did the juke box makers about a year ago. A volatile industry, it, however, may suddenly see its playing public's affections switch to some new device, demand for which in turn will skyrocket.

Amusement devices lack the bulk and variety of steel and metal products which go into vending machines. Their "brains" are extremely complex, have "memories," require skill in design and assembly, but are not large metal consumers. Probably a new amusement device will have about the same metallic requirements as present ones do. Only exterior housings are subject to drastic change. The shuffle alley, for example, uses lots of wood; a new device might be predominantly plastic.

Slot Machines Under Fire — Slot machines, some 209,000 of which are thought to be in operation, are the coin machine with, in all probability, the shortest life expectancy. A bill hamstringing their makers has been introduced in the House by Prince H. Preston (Dem., Ga.). This would prevent shipment of slot machines in interstate commerce. Operation of slot machines presently is legal in only three states, and the bill if enacted might initially mean a growth in slot machine manufacturing in these. Tighter law enforcement against their use elsewhere would probably put a crimp in the operations of established manufacturers.

Temco Makes Vending Unit

Texas Engineering & Mfg. Co. Inc., Dallas, has been given a "several million dollar contract" to build soft drink cup-vending machines for Super Vend Sales Corp., Chicago.

The machine that Temco will build is a soft drink cup-vending device which gives the purchaser a choice of three different beverages.

Engine Analyzers for Air Force

ENGINE ANALYZERS that can detect as small a defect as improper operation of a single spark plug are being ordered now for the Air Force.

Made by Sperry Gyroscope Co., Great Neck, L. I., N. Y., 45 of the new electronic devices were ordered for the Strategic Air Command. They have been used on commercial airplanes and smaller aircraft. With them the Air Force hopes to boost the range of its long-distance bombers by more efficient engine operation.

Tick, Tock—Another Clock

Timepieces to come off assembly lines in 1950 at near the record 1948 rate

CLOCK manufacturers expect 1950 production to exceed the estimated $110 million output in 1949 and nearly to equal the record 1948 level when an estimated $117 million worth of clocks and clock parts were made (see chart).

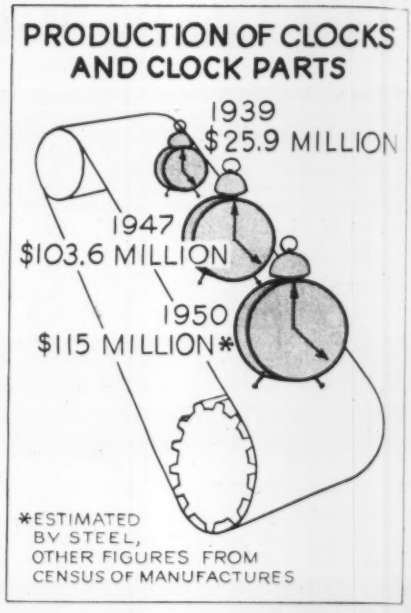
One of the major factors influencing demand for clocks is new housing construction. A record 80,000 nonfarm dwelling units were started in January, and February is expected to be another unusually good month. Other factors affecting clock demand include the high marriage rate, new designs and style trends and relatively low and stable prices. Spring wound and weight operated alarm clocks remain the best sellers.

Cost Up — Production costs are about the same as in 1948, but double the prewar level. One company reports its selling prices today are almost identical with those of 1920, although in the past 30 years labor has gone up almost 700 per cent. The industry is driving to reduce the labor content in clock production. Much of its capital outlay since the war has been directed to this end.

Most clock manufacturers make nearly all their own parts. Brass for the clock works is the major metal used. It's no accident that a large part of both clock and brass production is concentrated in New England.

Started in New England — Clock manufacturing in the U. S. got its start during the early 19th century in New England. Clock makers played a big role in development of the modern mass production technique. It was not long after Eli Whitney first began to probe the possibilities of volume output in firearms that Seth Thomas and Silas Hoadley joined Eli Terry in the first large-scale production of clock movements with interchangeable parts.

In 1807 Terry, Thomas and Hoadley started a project to make the unheard quantity of 4000 clock movements. Most of the parts were of wood, fashioned on machines driven by water power. So profitable was the venture that each of the three partners went into business for himself. Seth Thomas clocks are made today by a unit of General Time Corp. Introduction of machine-made brass movements in 1837, development of the mainspring to replace weights for motive power in the 1850s and the evolution of the lever-type movement to replace the pendulum in the late 1860s are among the milestones in U. S. clockmaking. Although refined and improved in the past 75 years, the clock with the lever-type movements is still the most popular timepiece today.



Kettering To Talk on Lubrication

CHARLES F. KETTERING will be the banquet speaker at the fifth annual convention of the American Society of Lubrication Engineers, Hotel Statler, Detroit, Apr. 10-12. Mr. Kettering is a pioneer in the development of the modern automobile and former vice president and director of General Motors Corp. He'll talk on "Lubrication—the Insurance Policy of Production."

SETH-THOMAS CLOCK
. . . still ticking

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ne in January for Homebuilders

Activity last month was the highest they have ever seen in a January. February housing starts also look unseasonally high. Result: Impetus to metalworking

S SPRING promises to give an tus to metalworking companies ufacturing anything from ap- ces to plumbing fixtures, from s to nails, from lawnmowers to llators. The reason: Homebuild-

tivity last month was the est homebuilders have ever seen January. The Bureau of Labor stics says builders started 80,- new nonfarm dwelling units in ary. That was an increase of units over December, and 30,- or 60 per cent over January,

bruary Starts High—Telegraphic rts of local building permits issued nuary in principal cities in the S. indicate that housing starts February also may be at an sonally high level. Since Jan- was the seventh consecutive h in which homebuilding activi- owed an increase over the same h in the previous year, chances good that February, too, will be ecord-breaker in new dwelling s. This month all regions ex- the Middle Atlantic and West h Central states reported in- es in the number of new dwell- nits authorized.

"An increasing number of new homes," says Rodney M. Lockwood, president of the National Association of Home Builders, "were in the lower-price brackets."

Costs, Prices Going Up—He expects home prices to rise about 5 per cent in 1950. Costs have already risen 4 per cent since January, 1949, and are still on the way up.

"Last year we did everything we could do to trim things out of houses so we could keep costs down," he said. "I doubt if there's much more we can do in this direction to fight off increased costs."

Last week at the NAHB convention a drive was launched to promote construction of middle-income housing by private builders. It was aimed at producing two-bedroom units that will rent from $65 to $70. The homebuilders set a goal of 250,000 such units to be constructed this year.

Price Spiral Again—Mr. Lockwood thinks if the government enters the materials and land market with its planned 135,000 units for 1950 "we'll really be going up the price spiral."

President Truman has already given approval to the Public Housing Administration to make loans to local housing authorities in an additional 102 localities to enable them to plan 24,466 low-rent homes for low income families. The loans authorized are for $6,461,900. They will help local housing authorities in 28 states and Puerto Rico plan over $200 million of low-rent housing.

Mr. Lockwood was probably worried about the cut private builders took in the share of building construction in 1949. They took 73 per cent of it then; in 1948 they had taken 78 per cent.

About $14.1 billion of new construction financed with private funds was put in place in 1949—about $500 million or 3 per cent less than the equivalent figure for 1948. Private builders got less because of this decline and a $1 billion increase in publicly financed construction.

DY FOR SPRING BOOM: Joliet Works of American Steel & Wire Co., Steel subsidiary, installed the last three of 36 new nail-making machines reparation for the spring building boom. Each set of six units is capable rning out 20 tons of roofing nails each week. Much faster than the old machines that they replace, the new ones produce 325 nails a minute, ranging from ¾ to 2 inches long

Home Loan Applications Rise

More than twice as many veterans are now financing the purchase of homes under the GI Bill as compared with a year ago, Veterans Administration reports.

An unprecendented mid-winter rise of 4500 home loan applications in January, 1950, over the December, 1949, total raised January receipts to 42,024—the largest number for any month since November, 1947, VA says.

RFC Cracks Down on Lustron

Early last week the government foreclosed on its venture in mass production housing when it filed a petition against the $37.5 million Lustron Corp., Columbus, O.

Reconstruction Finance Corp. attorneys included 11 items in their accounting. Among the items were a demand against Lustron for $36,466,-273 and against Carl G. Strandlund, company president, for $15,485,875.

Huge Plant for Sale Again

THE GOVERNMENT'S 480 - acre Dodge-Chrysler aircraft engine plant outside of Chicago, once leased to Tucker Corp., will be advertised for sale under the liberalized National Security Clause, Jess Larson, General Services administrator, announces.

Plans are being made to advertise for bids early next month. Purchase proposals will be given first consideration.

"The property and equipment," says Mr. Larson, "are adaptable for purposes for which there is a current demand—general manufacturing, assembly, machine shops, forging, foundry, warehousing and offices. A purchaser could operate the property intact or lease sections to smaller business enterprises."

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Coal-hydrogenation may open a new market for special machinery and equipment—the kind that can withstand severe operating conditions

DEVELOPMENT of an economical method of converting coal into liquid motor fuel may open up a great new market for special machinery and equipment that will have to be fabricated largely from steels capable of meeting severe operating conditions—terrifically high temperatures mostly. Full achievement of the development is in sight.

Manufacturers should be able to get some profitable fabricating tips from a pamphlet that describes the equipment installed at the Bureau of Mines' coal-hydrogenation demonstration plant at Louisiana, Mo. Under the prosaic title, "Report of Investigations 4584; Special Equipment in the Coal-Hydrogenation Demonstration Plant," companies making heat exchangers and related equipment will find some particularly interesting reading. A good many of these companies contributed to the development of equipment installed at the Louisiana plant.

The Ground Floor—Says the bureau: "These manufacturers gained considerable knowledge of high-pressure design and fabrication methods—a long step toward preparing them for conversion necessary in building full-scale plant equipment."

Among items discussed in the pamphlet are: High-pressure vessels, converters, preheaters, heat exchangers, hydrogen production and compression, nitrogen gas production and compression, pumps, high-pressure tubing, flanges, fittings and valves, and low-pressure auxiliary operations. Since most of the designs were not available on the regular market, they had to be specially created.

The pamphlet identifies and describes the steels and alloy steels selected to meet highly corrosive service conditions and gives information on some of the more recently developed alloy compositions.

The German Method—Of special interest is a section describing German methods for producing high-pressure vessels by feeding strip steel into a special lathe where vessels are formed by winding. Each layer is preheated to between 800 and 900° C and shrunk firmly onto the previous layer.

Advantages claimed for wound vessels over those forged from solid plate are: 1. Use of corrosion-resistant material is reduced because only the inner portion of the vessels need the properties; 2. production costs are lower by 20 to 30 per cent; 3. wound vessels can be fitted for higher-pressure use by simply adding more layers of strip steel; 4. less material must be removed by machining; 5. no heavy forging equipment is needed (the heaviest forgings required for wound vessels are the comparatively light heads) so the sizes of wound vessels are limited only by the capacity of cranes and other handling facilities available.

The pamphlet is replete with flow-charts, half-tones and line drawings that clarify understanding of the equipment and the conditions under which it must function. You can get copies free by writing to the Publications Distribution Section, United States Bureau of Mines, 4800 Forbes St., Pittsburgh 13.

More Hydroelectric Power?

NEXT STOPS for government resource planners are New York state and New England; chances are good that resulting recommendations will be for two hydroelectric power authorities.

President Truman called for congressional authorization of a two-year study of land, power and water resources in the two areas. He directed attention primarily to the need for carrying out the St. Lawrence seaway project, for redeveloping the power capacity of Niagara Falls and for development of the Passamaquoddy project in Maine. He proposed a seven-member study commission with an advisory body composed of the governors of the states.

Opposition Rising to Frear Bill

BUSINESS OPPOSITION to S. 2408, by Sen. Joseph A. Frear Jr. (Dem., Del.) is growing rapidly. The Delaware farm supply and machinery distributor wants to force Securities & Exchange Commission registration and reporting on all companies worth $3 million or more and owned by 300 or more shareholders.

It is charged widely in the capital that the real purpose is to force these small organizations to disgorge presently confidential information that labor unions could use in bargaining.

The Chamber of Commerce of the United States thinks the Securities & Exchange Act has inflicted genuine harm on industry. SEC operations

NEA

ATOMIC DEFENSE: As part of civilian defense against an atomic blitz, the Joint Congressional Atomic Energy Committee is looking into the possibility of making geiger counters available to the public. Here, Sen. Brien D. McMahon (Dem., Conn.), left, and Sumner T. Pike, acting chairman of AEC, examine one of the devices that can detect atomic radiation

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C of C officials think, serve more to confuse and baffle investors rather than to enlighten them. So the chamber has requested the Senate Banking & Currency Committee to make an investigation of the SEC program.

In the meantime the chamber would like to see the prevention of any such legislation as the Frear bill.

$913 Million for Gas Lines

CONSTRUCTION of pipelines for transportation of natural gas promises to be active for a long time to come—to judge from projects before the Federal Power Commission.

Now pending are 15 applications calling for expenditure of $913 million. If these projects are carried out as planned, they will increase existing gas pipeline mileage from 30,000 to 44,000 miles. The number of big projects is unusual: Of the 55 applications, 15 call for 13,000 miles of large diameter pipe—up to 30 inches. Largest mileages involved are 1731 for the Atlantic Gulf Gas Co., 2346 for Southern Natural Gas Co., 1365 for Piedmont Natural Gas Co. and 1040 for Tennessee Gas Transmission Co.

Seaway Hearings "Arranged"

BACKERS of the St. Lawrence seaway project arranged a novel schedule of hearings on the embattled proposal at this session.

The House Committee on Public Works has designated the period, Feb. 27 to Mar. 10, for the oral presentation of testimony by proponents of the scheme, then there will be a gap of nearly two months before opponents can tell their stories.

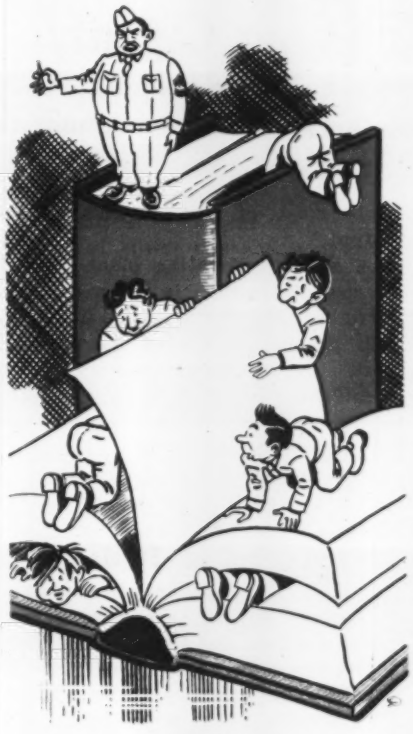
They're to have an indefinite time starting Monday, May 8, when —in view of the many important election contests looming for settlement in the November elections—many congressmen will be interested in speeding toward adjournment.

Cataloging Being Simplified

WORK on the armed forces' standard cataloging system is being stepped up to have it completed no later than July 1, 1952.

After that date all catalogs and published material will bear a single identification, number and description of each supply item wherever it may be found and regardless of its use. The currently used 5 million names and descriptions will be reduced by considerably more than 50 per cent.

A certain cotter pin was procured under 271 numbers, all describing



"Detail! Find that number!"

the same thing. A nut was being stocked under 253 numbers; a lock washer under 922 numbers; and a certain screw under 262 numbers. Now a single number applies to each of these items. Important savings are anticipated in procurement, warehousing, record-keeping and the use of personnel when the system comes into full use.

Pollution: Pressing Problem

LABELED "one of the most pressing problems facing the country today," air pollution is getting a lot of government attention.

About a year ago Dr. Louis C. McCabe, chief of Air & Stream Pollution, Bureau of Mines, was appointed chairman of an interdepartmental committee to study the subject.

His committee says industrial expansion and development of new industrial processes are contributing to "health hazards, destruction of growing crops, dangers to air travel, blighting of recreational areas, loss of valuable resources and damage to property."

A national conference on air pollution, the first government-sponsored affair of its kind, is to be held at the Interior Department's auditorium May 3, 4 and 5 to help find a solution to the problem.

Interested units are the Interior, Agriculture, Commerce and Defense departments and the Atomic Energy Commission.

**********CAPITAL COMPASS**********

COST-reducing suggestions by civilian employees resulted in savings of $2,677,888 by the Army in 1949. During the year, 18,858 suggestions were received; 3688 were accepted and placed in effect. Payments to suggestors ranged from $11.07 to $275. The total was $101,960.83. . . .

Valuable wage chronologies are to be found in Bureau of Labor Statistics Bulletins Nos. 970 and 970-2, available at 25 and 10 cents, respectively, from Superintendent of Documents, Washington 25. They contain complete wage records since 1940 or earlier for United States Steel Corp., the bituminous coal industry, Chrysler Corp., American Woolen Co., the northern cotton textile industry, Armour & Co., Swift & Co., and the full-fashioned hosiery industry. . . .

Six communities have been added to the government's list of those in which unemployment is 12 per cent or more: Leavenworth, Kans.; Cheboygan, Mich.; San Diego, Calif.; Silver City, N. Mex.; Clinton, Ind.; and Washington county, Me. Commerce Department's Small Business Division is studying the possibility of easing conditions in these areas through government procurement. . . .

Case Study No. 7 in the series "Causes of Industry Peace Under Collective Bargaining" treats of the labor relations of Nashua Gummed Coated Paper Co., Nashua, N. H., and seven AFL unions. The record is one of 15 years without a strike or lock-out; issues were negotiated as they arose resulting in frequent changes of labor contract. You can get copies of Case No. 7 for $1 from National Planning Association, 800 21st St. N.W., Washington. . . .

For the future guidance of government or other individuals charged with responsibility of obtaining increased production of strategic and critical materials, the Bureau of Mines prepared a "History of the Premium Price Plan for Copper, Lead and Zinc, 1942-7." Identified as Information Circular 7536, the volume contains the order under which the plan came into being, the forms that had to be filled in by participating companies, the premiums and allowances paid to these companies, the methods of calculating them and the success of the plan in stimulating production of these war metals.

West Europe Expands Power Capacity

French and Italian programs are the most ambitious. Steam generating as well as hydroelectric plants are being built as insurance against drought

WESTERN EUROPE'S power shortage is being solved with large scale power expansion programs, particularly in France and Italy. Steam generating as well as hydroelectric plants are being built to guard against drought, such as occurred last year.

Britain, Belgium-Luxemburg and Germany are also expanding but not to the degree that other Marshall Plan countries are. These three rely mostly on steam generation and emerged from the war with facilities more nearly adequate for their needs than their neighbors.

French electric production at the end of 1949 was 30 billion kwhr. The 1952 goal is 42 billion kwhr. The aim will be achieved when the 58 hydroelectric and several thermal projects now underway in France are completed.

Italy, especially hard hit last year by drought, will build three new steam generating plants at a cost of more than $30.9 million.

Norway is building a series of 19 "undermountain" power plants that when completed will add 1.5 million kw to present generating capacity of 3 million kw.

France Reroutes a River

French engineers are piping a river through the Alps to complete the $16 million Passy-sur-Arve hydroelectric project.

Water for the plant will be drawn from the Arve and Diosaz rivers through more than six miles of tunnels blasted through the mountains. The water will cross the Arve via a syphon pipe bridge spanning a mountain gorge and will pour through a huge conduit in a 1280-foot waterfall.

When completed in 1951, this power plant, one of 58 now underway in the hydroelectric program, will add 366 million kwhr annually to France's power generating output. The equivalent of $7 million in counterpart funds is being spent on the project. In addition, Marshall Plan dollars are being used to purchase American machinery and construction equipment. In 1949, Marshall Plan funds, including direct dollar aid and counterpart, were used for 97 per cent of Electricite de France's power expansion. Electricite is the government agency that controls most of the nation's power output.

A steam generating plant project to cost $20 million is in progress at Arrighi, near Paris. ECA financing will provide $4 million toward the cost. A boiler and accessory equipment will be purchased in the U. S. Equipment to expand capacity of the present steam-electric station at Arrighi by 100,000 kw is included in the projects. The 100,000 kw turbo-generator unit and accessory equipment will be manufactured in France.

Cartel in Tools?

Cartel talk is not waning in Europe. British, French, Belgian, Italian and Swedish manufacturers of hand tools, dies and jigs have contacted the Germans about concluding a cartel agreement in these lines. The Germans claim that the French, in recent foreign trade negotiations, insisted upon certain price regulations in various Ruhr industries as a condition for further "liberalization" of trade within the framework of the OEEC.

Schneider & Co., a producer and fabricator of steel, plans a rehabilitation program, and will spend $1,930,000 in ECA funds for U. S. machine tools and other machinery. About $1,732,000 will go for machine tools and accessories and $198,000 for other machinery.

Italy Turns to Steam

Italy hopes to beat the weather with three new steam generating plants for electricity. Last year the nation's industrial production was crimped when the drought curtailed hydroelectric power output.

Societa Idroelettrica Piemonte (SIP) will install a 50,000 kw turbo-generator set and related steam generators and accessories in a new plant to be built near Turin. Local currency requirements for the project, which the company will meet through normal financial channels, are estimated at the equivalent of $4,134,000. ECA assistance will total $6,215,000, plus $325,000 ocean freight. It is expected that this plant will ultimately be expanded to reach a capacity of 200,000 kw. SIP is one of the major power companies of northern Italy, and its lines form part of the Italian interconnected power network.

Two other projects will also get ECA assistance. One is for installation of an additional 60,000 kw of steam power generating capacity in the Maurizio Capuano plant at Naples of Societe Meridionale di Elettricita (SME). ECA financing amounts to $6,143,000 and lire requirements are the equivalent of $2,885,000. This is the second project for the expansion of this station. ECA financing of $3,432,000 was approved last May for a 30,000 kw addition to the plant. SME, which is now heavily dependent on hydro power, produces about 90 per cent of the total electric power sold in southern Italy.

Another project involves installation of a 60,000 kw turbo-generator set and related steam generators and accessories in a new plant to be built at Civitavecchia in central Italy. The plant layout has been planned to permit ultimate expansion of the station to a total capacity of 180,000 kw. It is expected that the first 60,000 kw unit will begin operating at the end of 1952. Total cost of this program is the equivalent of $11,238,000, including $6,110,000 in ECA financing. The development is sponsored by Societa Romana di Elettricita in association with other utilities.

Norway Builds New Plants

Norwegian engineers are blasting out hundreds of thousands of tons of rock beneath mountains to install hydroelectric power plants that can be proof against any form of aerial attack.

Fourteen such "undermountain" power plants are now under construction and another five have been completed. When all 19 are ready, they will have an initial capacity of 1 million kw and an ultimate capacity of 1.5 million kw. Today, Norway's total generating capacity is 3 million kw. The 19 plants will be integrated by a special grid system.

Ruhr Halts Steel to Soviets

Western Germany has stopped steel shipments to the Soviet zone until Mar. 15.

Orders placed for Ruhr steel are increasing in spite of the embargo on Soviet-bound shipments. Employment in the industry is holding up well, although general unemployment in the new republic is increasing and is now about 2 million. The Germans want to raise the steel

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production ceiling, now set at 11.1 million net tons annually by the Allies, but chances for permission are slim.

The reorganization of the steel industry still is at a standstill, so private firms like Vereinigte Stahlwerke have taken the initiative and worked out a reorganization scheme of their own. One plan calls for a new grouping of the steel industry around a few vertically integrated companies that have a sound business structure and would be able to gain the confidence of foreign investors. The plan will be presented to the Allies and might supersede the tedious procedures of the custodians' office and Allied control office.

Belgian Plant Modernizes

A project for installation of a semicontinuous hot strip steel mill at Ougree, Belgium, for S. A. Ougree-Marihaye as one step in modernizing its rolling equipment has been approved by ECA.

The overall cost of the project is estimated at the equivalent of $16.8 million. Equipment to be purchased in the U. S. will require ECA financing of $7,650,000. The balance of the total will be met by the company in local currency.

The 66-inch mill will include a four-high rolling mill and four-stand finishing equipment. It will produce about 415,000 net tons per year of plates and sheets. The purpose of this project is modernization of rolling equipment rather than expansion of production. Ougree-Marihaye is the largest iron and steel plant in Belgium; it produces 90 per cent of the strip made in that country.

Dutch Output Up

Netherlands industrial production, which in 1948 was 13 per cent above the level of 1938 and in 1947 6 per cent below that level, rose in 1949 to 125 per cent of 1938.

The population had, in the meantime, increased by 12 per cent. A further increase in industrial output, to 150 per cent of the 1938 average, is considered necessary if the balance of payments problem is to be solved.

Industrial productivity increased only slowly in 1949. Part of the responsibility for this is placed on the wage system which maintains very small differentials between unskilled, semiskilled and skilled wages and thus weakens the incentive for further professional training or for increased output.

Dutch railroads have ordered 25 locomotives from the U. S. The first unit will be delivered early in 1951. The equipment will be designed for speeds up to 100 miles per hour.

G E To Equip Turkish Mine

General Electric Co. will supply the electrical equipment for the ECA-sponsored power conversion program at the Soma lignite mine in Turkey. All electric equipment will be shipped sometime in 1950.

Sykes Gets Washington Award

WILFRED SYKES, chairman of the executive committee of Inland Steel Co., was given the Washington Award for 1950 late last week.

The honor bestowed upon engineers for "accomplishments that preeminently promote the happiness, comfort and well-being of humanity," was founded in 1916 by John Watson Alvord. It is administered by the Western Society of Engineers on recommendations of a commission representing: American Society of Civil Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers and the Western Society of Engineers.

Boon to Business World

A BUSINESSMAN who heard that the Commerce Department had brought out its new trade association handbook was worried. "Do I have to spend another year getting familiar with how to find organizations that I'm interested in?" He doesn't.

National Associations of the United States, the thirteenth in a series that Commerce started back in 1913 has a logical organization that will help businessmen, researchers, editors or anyone else interested in locating organizations to find quickly what they want to know.

It lists 1500 trade associations, 2500 farm, labor, professional and other national groups. Chambers of commerce, local labor unions, civic service groups and other local affiliated groups are in the book. Its index will help you locate associations you may not have known existed: Mutation Mink Breeders Association, National Armored Car Association, American Institute of Wholesale Plumbing & Heating Supply Associations or National Auto Wreckers Association.

You can get copies for $3.50 from the Superintendent of Documents, Washington 25, or from any Commerce Department field office.

CALENDAR OF MEETINGS

Feb. 27-Mar. 3, American Society for Testing Materials: Committee week and spring meeting, Hotel William Penn, Pittsburgh. Society headquarters are at 1916 Race St., Philadelphia.

Feb. 28-Mar. 1, Chamber of Commerce of the United States: National marketing conference, Hotel Book-Cadillac, Detroit. Chamber headquarters are at 1615 H St. N.W., Washington.

Mar. 2-4, Society of the Plastics Industry, Pacific Coast Section: Annual conference, Hotel Del Coronado, San Diego, Calif. Society headquarters are at 295 Madison Ave., New York.

Mar. 3, Malleable Founders' Society: Eastern sectional meeting, Hotel Commodore, New York. Society headquarters are in the Union Commerce Bldg., Cleveland.

Mar. 6-10, American Road Builders' Association: 47th annual meeting, Netherland Plaza Hotel, Cincinnati. Association headquarters are in the International Bldg., Washington.

Mar. 8, American Society for Testing Materials, Philadelphia District: Meeting on air pollution, Philadelphia. Society headquarters are at 1916 Race St., Philadelphia.

Mar. 10-11, American Foundrymen's Society, Ohio Chapters: Regional conference, Cincinnati. Society headquarters are at 222 W. Adams St., Chicago.

Mar. 14-16, Society of Automotive Engineers: Passenger car, body and production meeting, Hotel Book-Cadillac, Detroit. Society headquarters are at 29 W. 39th St., New York.

Mar. 16-17, Pressed Metal Institute: Technical symposium on cold extrusion of steel, Hotel Carter, Cleveland. Registration fee is $5 for anyone interested. Institute headquarters are at 13210 Shaker Sq., Cleveland.

Mar. 20-25, Concrete Reinforcing Steel Institute: Meeting, at The Shamrock, Houston. Institute headquarters are at 38 S Dearborn St., Chicago.

Mar. 21-22, Steel Founders' Society of America: Annual meeting, Edgewater Beach Hotel, Chicago. Society headquarters are in the Midland Bldg., Cleveland.

Mar. 22-23, Malleable Founders' Society: Market development conference, Evanston, Ill., in co-operation with Northwestern University. Society headquarters are in the Union Commerce Bldg., Cleveland.

Mar. 24, Malleable Founders' Society: Western sectional meeting, Drake Hotel, Chicago. Society headquarters are in the Union Commerce Bldg., Cleveland.

Mar. 28-31, Society of the Plastics Industry: Fourth national plastics exposition, Navy Pier, Chicago. Society headquarters are at 295 Madison Ave., New York.

Mar. 29, Material Handling Institute Inc.: Meeting, Hotel Cleveland, Cleveland. Institute headquarters are at 1108 Clark Bldg., Pittsburgh.

Apr. 3-4, Association of Iron & Steel Engineers: Spring conference, Birmingham. Association headquarters are in the Empire Bldg., Pittsburgh.

Apr. 4-7, National Association of Corrosion Engineers: Sixth annual conference, St. Louis. Association headquarters are in the Southern Standard Bldg., Houston.

Apr. 5-7, Midwest Power Conference: Sponsored by Illinois Institute of Technology and 18 universities and professional societies, at Sherman Hotel, Chicago. Conference director is Roland A. Budenholzer, Illinois Institute of Technology, 3300 S. Federal St., Chicago.

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BRIDGEPORT 2, CONNECTICUT

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Kaiser-Frazer models, introduced at Chicago auto show, rate second to Ford in audience applause. Dealers crying in beer over lost seller's market

DETROIT

BY GETTING away from Detroit occasionally and "talking automobiles" with people less intimately associated with the manufacturing side of the business it is possible to get a little more evenly balanced viewpoint of the industry. Such an opportunity presented itself on the occasion of the opening of the recent 42nd annual automobile show sponsored by Chicago dealers, host being the Kaiser-Frazer Corp. whose chartered DC-4 whisked a group of better than 50 over to the Windy City almost in less time than it takes to consume a good dinner.

Visit to the auto show at the International Amphitheater was in the nature of a preview on the evening preceding the official public opening, although Chicago dealers had done such a good job of distributing free tickets that it was practically impossible to get a leisurely closeup of any exhibits of cars, trucks, trailers and accessories.

Public Reaction on Display—However, you could get a good cross-section of public reaction and it appeared enthusiastic. Nineteen passenger cars were presented formally at a pageant featuring girls, music and a Washington-Lincoln patriotic tie-in. Although the talent left something to be desired, the cars were pretty and the level of applause greeting each make could be construed either as comparative public approval or the relative number of friends competing dealers had managed to pack into the house. As we gaged it, Ford ranked first, followed by Kaiser and Frazer. The latter two could be expected in the forefront since this was the first time the cars had been shown to the public anywhere and they are distinctively new. It seemed to be the general belief that K-F would steal the show and this was confirmed in the affair's early hours.

(An inflationary note was the last-minute pasting of 50-cent stickers on official programs which had been imprinted with a 25-cent price).

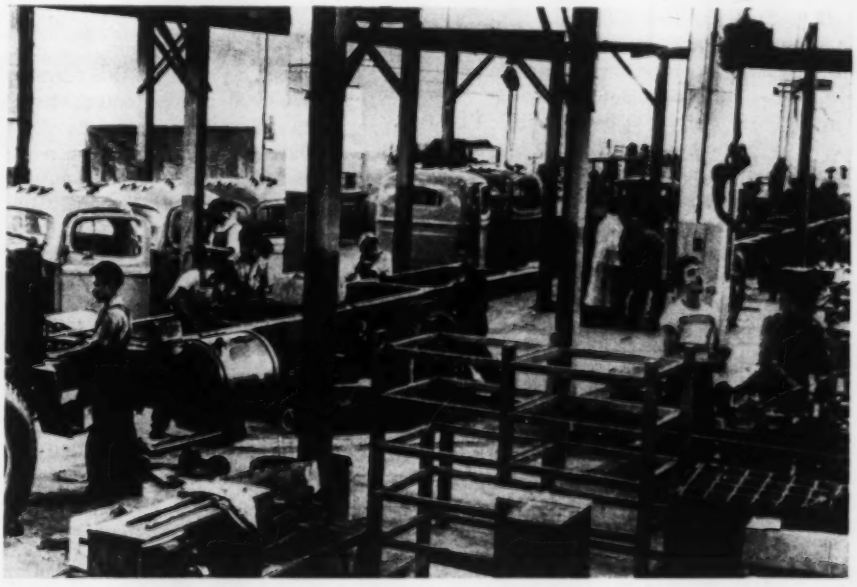
Wants List Price Cut—Troubles of a large Chicago dealer in one of the independent makes of passenger cars, who was seated next to this observer during the stage presentation, were more interesting than the drumbeating. He claimed business was lousy at his establishment and could be improved only by a $500 reduction in the manufacturers' price. He said the only Chicago dealers making any money were Chevrolet, Ford, Plymouth and possibly Pontiac, with the outlook darkening by the hour for Plymouth dealers as their new car stocks evaporate. Labor rates, commissions, rental costs and other operating expenses are double and triple prewar levels, making it impossible to overallow on used cars to move new ones. He gave it as his opinion that nearly all dealers are simply living off the fat of the last four years.

Competition Hurts—As the tears flowed on, the poor fellow explained that the core of his troubles really was another Chicago dealer handling the same make of car who was out high pressuring for business with 27 salesmen on the floor, radio advertising, searchlights and extra-long allowances on used cars. This technique brought in 250 new car sales for January, but, our friend explained, each one was at a substantial loss. How could this be? Well, it seemed, the dealer in question was content to take the loss on new cars, hoping to more than make it up with a hefty volume bonus from the factory at the end of the year.

Getting back to K-F for a moment, there were a score or more of plant officials, from Messrs. Kaiser and Frazer on down, accompanying the Detroit press party. Uniformly they reflected a quiet confidence in their new line which will be going into production next month. A good start has been made in building up parts banks and subassemblies, so that final assemblies can be pushed ahead rapidly. They feel they will be in good shape on engines, with redesigned and beefed-up sixes coming from Continental in Muskegon for the Kaiser, although the latter is not scheduled until late in June. Future of K-F's Detroit engine plant is doubtful, for the reason that it has been extremely difficult to obtain a reasonable day's work from the working force there.

At one time consideration was being given to switching to International Harvester's new 220 truck engine, modified for passenger car installation, but the plan fell through after some question over plant capacity and price.

Use Hydra-Matic Transmissions—K-F is quite happy over being able to offer Hydra-Matic drive on its



WHITE TRUCKS: Here is how White Trucks are assembled in the suburban Santa Maria plant of Automatriz de Mexico. The plant employs about 200. Production Manager Ing. Manuel Robleda was trained at the White plant in Cleveland. The company is operated by Herlinda Ancira Gonzalez, one of the leaders in the highly competitive automotive industry in Mexico

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1951 line. Reports are that adaptation of the transmission was one of the easiest of any outside the General Motors family. Incidentally, approval by GM of sale of the transmission to K-F came in the form of a "Christmas gift" last Dec. 24.

Closes Foundry—The Kaiser-Frazer gray iron foundry at Dowagiac, Mich., acquired some time ago for production of small parts such as manifolds, water pumps, etc., has been closed down as an uneconomical operation, these parts now being purchased on the outside. K-F's thinking on a foundry is that the only sensible way to set it up is as an integral part of an engine-building plant, with straight-line operation right through from cupola charging to completed engines. This is, of course, approximately what Ford is planning at Cleveland.

J. W. Frazer was on hand at the K-F preshow reception and said that the company's success in postwar years had been largely a matter of "availability." While in the future it is going to be necessary to sell style, performance, price and the other factors as they had never been sold before. He brushed aside a question as to how much he figured "availability" meant to buyers during 1946-1949 in terms of dollars and cents.

Rambler—by Nash

TO OLD-TIMERS who used to ride Rambler bicycles before the turn of the century, the name Rambler will ring nostalgic bells. So these veterans, along with thousands of others, will get a double kick some time in April when Nash unveils its new 100-inch wheelbase Rambler two-door sedan, now in production at a rate of around 15 daily. The Rambler is said to have been a British bicycle, for which American manufacturing rights were granted to the old Thomas B. Jeffery Co. As two-wheelers began fading from the picture, the elder Jeffery and his son decided to build an automobile and they showed their first model at the Chicago Auto Show in 1902. It was built at Kenosha in plants bought in 1916 by Nash. The Rambler was the second United States automobile to be built in what were considered volume quantities in those days—Oldsmobile was the first. After the death of the elder Jeffery in 1910, the name was changed to honor the founder of the company, and the Rambler has been dormant ever since. Charles T. Jeffery, a son, was a director of Nash Motors at its inception.

The Nash Rambler is not to be confused with the midget-size N.X.I. model, described in these columns several weeks ago. It is considerably larger, seating two in the rear, three in front, and powered by an 82-hp 6-cylinder engine. Tread is approximately standard. Convertible and station wagon models probably will follow the two-door sedan. Price has not been announced but it will naturally be well below the current $1700, including federal tax, quoted on the lower-priced line of present Nash models.

Other manufacturers doubtless are planning to keep a close watch on public reception of the new small Kaiser and Nash offerings. (No name selected as yet for the former, although 400,000 contest suggestions have been narrowed down to 200, with all fish, fowl, birds and animals ruled out). The big three manufacturers are inclined to regard the moves as nothing more than efforts to introduce models competitive pricewise with Chevrolet-Ford-Plymouth.

—Auto, Truck Output—

U. S. and Canada

	1950	1949
January	620,000*	445,092
February		443,734
March		543,711
April		569,728
May		508,101
June		623,689
July		604,351
August		678,092
September		657,078
October		601,021
November		474,726
December		378,834
Total		6,528,157

Weekly Estimates

Week Ended	1950	1949
Feb. 4	127,428	102,981
Feb. 11	125,737	108,911
Feb. 18	125,936	114,207
Feb. 25	120,000	118,815

Estimates by Ward's Automotive Reports

* Preliminary.

Crosley on Light Cars

POWEL CROSLEY JR. takes a few potshots at manufacturers (Nash) who think they can build a $1000 car by using European-made engines and parts. He canvassed European suppliers recently to get prices on carburetors and found that what he needed would cost 30 per cent more more than what he was buying in this country. Commenting further on the size of the Crosley car, of which 70,000 have been built, its 6-foot, 4-inch progenitor says the dimensions were no mere designer's notion. If it had been built longer and wider, added weight would have been required in transmission, axle and other parts, not to mention the higher shipping costs. For example, if 5 inches were added to the width it would be possible to ship only eight to a freight car instead of 16, only six on haulaways against the present nine.

And not only that, says Mr. C. "the car is not built to a demand that will reach a million cars a year .... not built for those whose precarious social position necessitates 'keeping up with the Joneses' .... not built for six passengers when the average occupancy of the American automobile is less than two passengers .... (but it is) built for those who want a brand new shiny practical car instead of someone's beat-up second-hand or fourth-hand car ...."

Willys To Step Up Output

ACCELERATED production program, starting next month, on its regular line of vehicles, plus expanded jeep manufacturing for government order, together with the institution of a new sales drive under direction of L. W. Slack, recently named vice president in charge of distribution, has been divulged by Willys-Overland as part of its quarterly financial statement.

Retooling of hoods, fenders and front ends has been carried out on station wagon and Jeepster models to set them apart from previous designs. Talk has been heard in trade circles to the effect the appointment of Mr. Slack, an experienced passenger car sales manager, may herald a move by Willys into this field. The company has been playing with various designs for a small passenger car based along European lines, but the management has never felt it propitious to move the project into production.

GM Stamping at Pittsburgh

FIRST steel stamping was made at the new General Motors Corp. plant in the Pittsburgh district, Feb. 20. Even though the plant, to be operated by the Fisher Body Division of General Motors has not yet been turned over to the company by the contractor, the first press is now in operation, according to J. J. Cronin, vice president, General Motors, and general manager of Fisher Body Division.

About 1000 persons will be employed by July 1 at this stamping plant located at Dravosburg, Pa. Officials hope that ultimately the payroll will number 2000.

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ARISTOLOY STEELS

HIT THE MARK

Mechanical surface preparation of hot rolled blooms and billets for final rolling.

ARISTOLOY STEELS

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MAGNAFLUX— AIRCRAFT QUALITY

COPPERWELD STEEL COMPANY, WARREN, OHIO

117 Liberty Street
New York, New York

176 W. Adams Street
Chicago, Illinois

P. O. Box 1633
Tulsa, Oklahoma

1578 Union Commerce Building
Cleveland, Ohio

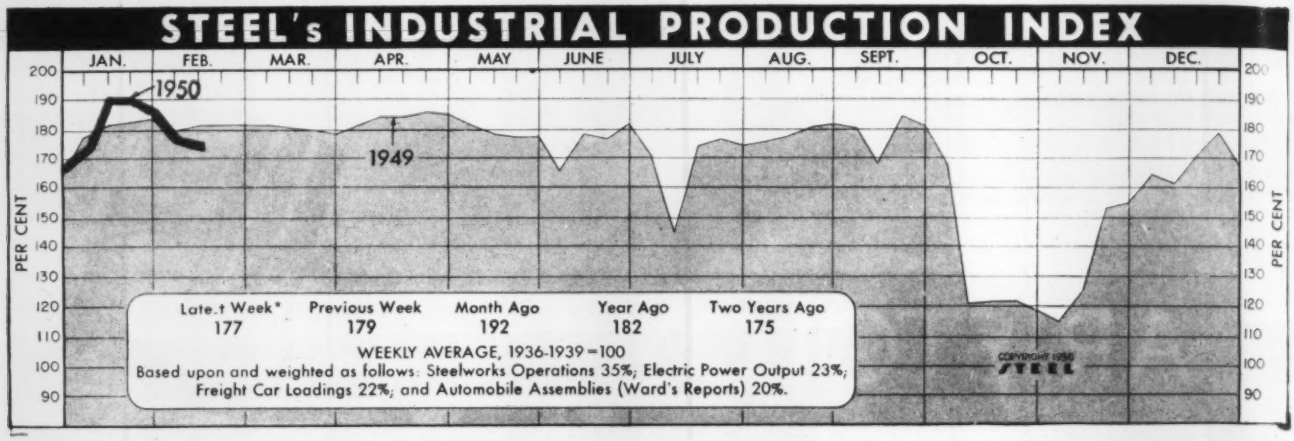
7251 General Motors Building
Detroit, Michigan

403 W. Eighth Street
Los Angeles 14, California

529 Fisher Building
Detroit, Michigan

3104 Smith Tower
Seattle, Washington

Monadnock Building
San Francisco 5, Calif.


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1950
1949
PER CENT
Late.t Week* 177
Previous Week 179
Month Ago 192
Year Ago 182
Two Years Ago 175
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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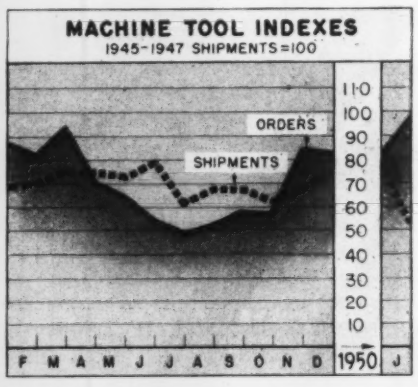
*Week ended Feb. 18 (preliminary).

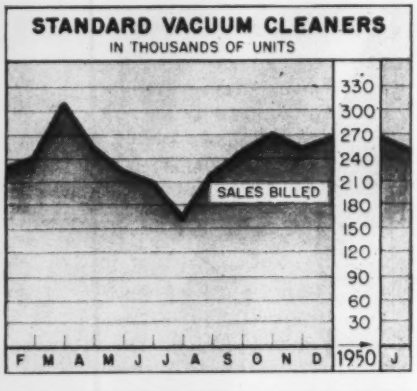


Charts—Copyright 1950, STEEL

Machine Tool Indexes

	New Orders		Shipments	
	1950	1949	1950	1949
Jan.	99.7	87.0	52.4	68.8
Feb.	...	80.9	...	70.3
Mar.	...	93.5	...	75.8
Apr.	...	70.1	...	74.7
May	...	63.7	...	72.8
June	...	53.6	...	79.0
July	...	48.0	...	60.7
Aug.	...	51.5	...	67.3
Sept.	...	57.7	...	67.6
Oct.	...	56.8	...	62.3
Nov.	...	84.3	...	67.6
Dec.	...	82.5	...	75.7

National Machine Tool Builders' Assoc.

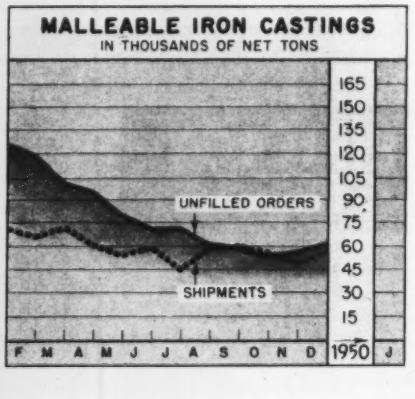


Standard Vacuum Cleaners

Sales Billed—Units

	1950	1949	1948
Jan.	249,150	228,769	304,273
Feb.	.....	241,267	311,448
Mar.	.....	309,897	355,415
Apr.	.....	252,656	306,588
May	.....	222,850	276,657
June	.....	207,354	256,071
July	.....	161,920	229,537
Aug.	.....	219,909	237,202
Sept.	.....	250,036	280,084
Oct.	.....	272,520	281,573
Nov.	.....	253,516	255,080
Dec.	.....	265,513	273,890
Total	.....	2,886,514	3,360,859

Vacuum Cleaner Manufacturers' Assoc.



Malleable Iron Castings

Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1949	1948	1949	1948
Jan.	71.9	77.7	126	206
Feb.	66.7	75.2	118	209
Mar.	72.1	86.8	102	203
Apr.	61.3	80.6	95	200
May	54.6	76.1	79	192
June	59.6	81.7	70	179
July	44.4	64.9	71	180
Aug.	58.1	73.3	61	177
Sept.	60.5	77.8	58	164
Oct.	57.2	81.8	54	158
Nov.	49.4	77.2	56	146
Dec.	57.4	79.9	61	137
Total	713.1	933.3		

*For sale. Bureau of the Census

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Fab. Struc. Steel..Feb. 13	Ironers, Standard..Jan. 2	Ranges, Gas ....Jan. 2
Fdry. Equipment..Feb. 13	Mfrs. New Orders.Jan. 2	Refrigerators ....Jan. 2
Furnaces, Indus. ..Jan. 2	Metalwkg. Emp. ..Jan. 2	Screw Mach. Prod..Jan. 2
Furnaces, Warm Air ..... Jan. 2	Metalwkg. Wages..Jan. 2	Steel Employment..Feb. 20
Gear Sales .....Feb. 13	Price Indexes ....Feb. 6	Steel Forgings ....Feb. 20
Gray Iron Castings.Feb. 6	Pumps .....Jan. 2	Steel Shipments ..Feb. 13
Indus. Production..Feb. 6	Radio, TV Prod. ..Jan. 2	Trucks, Elec. Ind..Jan. 2
	Ranges, Elec. ....Jan. 2	Washers .....Jan. 2

Tool Orders Climb Sharply

Machine tool orders hit their highest point since August, 1946, in January and reached an index figure of 99.7. Business continues at a good pace in February and builders are optimistic that the next few months will provide relief from low volume operations that have characterized the postwar period.

Shipments index slumped noticeably to 52.4 in January from 75.7 in December. A decline is normal in industry shipments for January as builders try to ship all the machines possible in December to reduce inventories and start off the year with a clean slate.

Foreign orders, which are included in the overall index by the National Machine Tool Builders' Association, also continued to rise. The January foreign orders index reached 26.7 from 22.4 in the preceding month.

Association indexes are based on average monthly shipments in 1945—1947 equaling 100. Average annual shipments in the base period were $355 million.

Vacuum Cleaner Sales Strong

Household vacuum cleaner sales in January increased 8.9 per cent over the corresponding month a year ago although they declined seasonally from December. Industry-wide totals compiled by Vacuum Cleaner Manufacturers' Association show that factory sales in January aggregated 249,150, compared with 265,513 in December and 228,769 in January, 1949.

Malleable Castings Turn Up

Improvement in malleable castings demand that began in December is continuing. Backlogs which declined through all of 1949 made their first rise at yearend. Orders by freight car builders for malleable are a big reason for improvement. Foundries expect improved operations to carry through the next few months.

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The Business Trend

Fuel conservation measures are derailing first quarter production plans, but demand is still strong in virtually all lines. Raw material supplies are causing wrinkled brows

INDUSTRY'S pace is gradually slowing down as the result of the coal strike. Major cutbacks have been announced by some companies and fuel conservation measures in varying degrees are derailing first quarter production plans for many metalworking concerns.

Demand is strong in virtually all lines. Machinery builders, foundries, steel companies and makers of consumer products are optimistic that they can maintain high level operations. Supplies of raw materials are the reason for wrinkled brows. A companion factor is the general air of uneasiness which deters the placing of new business.

Production Index . . .

STEEL's industrial production index slipped another 2 points in the week ended Feb. 18 to 177 per cent of the 1936-1939 average. Beginning with this issue STEEL's index is recalculated to account for the great postwar expansion in steelmaking capacity. The weighting now assigned to steel ingot output is based on tonnage produced rather than the operating rate. If you want a copy of the recalculated index on a weekly basis for 1948 and 1949, write to Business Trend Editor, STEEL, Penton Building, Cleveland 13, Ohio.

Automobiles . . .

Despite the Chrysler strike and the elimination of Saturday overtime to conserve fuel and steel, assemblies are coming off the line in U. S. plants at an annual rate topping 6 million. About 150,000 units were lost by the Chrysler strike up to Friday, Feb. 24. In the week ended Feb. 18 outturn in U. S. and Canadian plants was virtually unchanged from the preceding week at 125,936 units.

Steel . . .

Steelmaking rate is gaining momentum in its decline from operations at the beginning of February. In the week ended Feb. 18 it was down to 90 per cent of capacity, a decline of 1.5 points from the preceding week. Last week the drop began to show the effects of an increasing number of idle open hearths. More shutdowns are coming as steel producers who gambled on an early settlement of the coal dispute and maintained high level operations find stockpiles near rock bottom.

Coal . . .

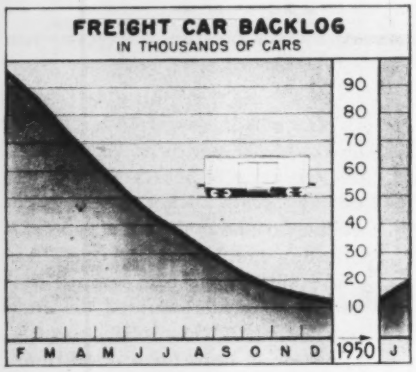
Bituminous coal output is down to about 2.5 million tons per week. This depreciated tonnage figure does not tell the whole story. Some of the coal being mined by Progressive Union or nonunion miners is not suitable for many industrial uses. Requisition by the railroads and diversion to home and institutional heating because of cold weather will take most of the meager supply.

Freight Cars . . .

Pickup in car ordering has carried into February after orders in January topped those for all of 1949. Further improvement is expected

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	90.0	91.5	93.0	100.0
	Electric Power Distributed (million kilowatt hours)	5,950‡	5,971	6,041	5,650
	Bituminous Coal Production (daily av.—1000 tons)	417	1,090	1,237	1,907
	Petroleum Production (daily av.—1000 bbl.)	4,950‡	4,951	4,962	5,390
	Construction Volume (ENR—Unit $1,000,000)	$120.0	$141.9	$182.2	$146.6
	Automobile and Truck Output (Ward's—number units)	125,936	125,737	158,432	114,207
	*Dates on request. †1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons. ‡Preliminary.				
TRADE	Freight Car Loadings (Unit—1000 cars)	573†	567	619	697
	Business Failures (Dun & Bradstreet, number)	185†	195	231	180
	Money in Circulation (in millions of dollars)‡	$26,993	$26,985	$27,121	$27,480
	Department Store Sales (changes from like wk. a yr. ago)‡	none	−1%	−5%	none
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$11,194	$14,360	$14,406	$12,711
	Federal Gross Debt (billions)	$256.7	$256.6	$257.0	$252.6
	Bond Volume, NYSE (millions)	$14.3	$18.3	$23.6	$14.4
	Stocks Sales, NYSE (thousands of shares)	8,849	8,739	7,977	3,908
	Loans and Investments (billions)†	$67.1	$67.3	$67.4	$62.2
	United States Gov't. Obligations Held (millions)†	$37,354	$37,595	$37,657	$33,016
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	155.05
	STEEL's Nonferrous Metal Composite‡	160.1	160.1	160.5	232.6
	All Commodities†	152.2	151.6	150.9	158.5
	Metals and Metal Products†	169.3	169.3	169.4	175.6
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

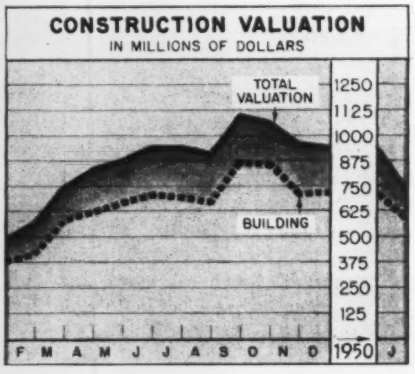


Freight Car Awards and Backlogs

	Awards		Backlogs*	
	1950	1949	1950	1949
Jan.	9,385	8,619	19,026	96,214
Feb.	....	332	.....	85,974
Mar.	....	199	.....	73,188
Apr.	....	30	.....	62,569
May	....	589	.....	52,281
June	....	153	.....	42,813
July	....	408	.....	36,564
Aug.	....	185	.....	28,731
Sept.	....	123	.....	22,203
Oct.	....	201	.....	17,377
Nov.	....	1,145	.....	14,146
Dec.	....	1,220	.....	12,036
Total	....	6,248		

*End of month.

American Railway Car Institute

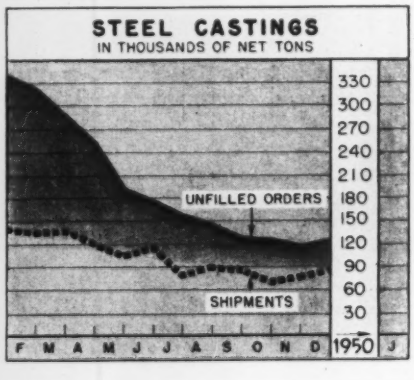


Construction Valuation

(37 States)—In Millions of Dollars

	Total		Building	
	1950	1949	1950	1949
Jan.	730.9	483.0	578.8	381.0
Feb.	....	568.5	....	415.0
Mar.	....	747.6	....	579.2
Apr.	....	842.6	....	620.2
May	....	880.3	....	666.9
June	....	945.7	....	706.7
July	....	943.6	....	690.9
Aug.	....	905.7	....	671.5
Sept.	....	1,093.7	....	870.6
Oct.	....	1,061.8	....	857.8
Nov.	....	957.8	....	701.3
Dec.	....	929.0	....	722.2
Total	....	10,359.3	....	7,883.3

F. W. Dodge Corp.



Steel Castings

In Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1949	1948	1949	1948
Jan.	140.6	141.1	338.9	491.7
Feb.	135.0	142.4	320.2	497.1
Mar.	138.9	162.9	284.8	508.8
Apr.	120.0	150.3	250.5	472.4
May	106.2	143.3	191.5	482.5
June	116.1	152.9	173.2	470.0
July	78.7	120.4	155.5	497.4
Aug.	90.0	140.2	143.6	472.5
Sept.	86.5	149.2	127.7	448.0
Oct.	70.7	153.0	124.8	424.5
Nov.	76.4	146.8	117.9	395.0
Dec.	84.5	157.4	122.9	354.5

*For sale. Bureau of the Census

after the settlement of the coal strike although February order volume will probably suffer through postponements of orders that normally would have been placed.

Prices . . .

Bureau of Labor Statistics wholesale price index advanced 0.4 per cent in the week ended Feb. 14. It was 152.2 per cent of the 1926 average, 1.9 per cent above four weeks ago and 4 per cent below the like week in 1949.

Truckloadings . . .

Volume of freight transported by motor carriers in December decreased 3.7 per cent below November but was up 2.7 per cent over December, 1948, says American Trucking Associations. Carriers of iron and steel hauled about 4 per cent of total tonnage. Their traffic volume increased 67.4 per cent over November, a strike affected month, and 25.9 per cent over the preceding December.

Demand Continues Strong

Allegheny Ludlum Steel Corp., Pittsburgh, reports sufficient business now is scheduled to maintain present high level operations through the second quarter. Demand for stainless steel and other company products is very strong.

In 1949 first quarter earnings were $1,542,195 out of the year's total of $1,976,323.

Strikes Mar Prospects

Lewis and Reuther's non-workers drawing mustaches on national economic picture

PROSPECTS for a near-record first half are being blighted by the coal and Chrysler strikes. Not only are large losses in production and wages being marked up now, but the stoppages threaten to exert a deferred influence on the national economy after the strikers return to work. This possibly will be felt in the second quarter and even in the second half.

The strikes are injecting both inflationary and deflationary factors into the economy. But the net results are sure to be harmful to the nation.

Wage, Output Losses High—How large are the losses incurred by the stoppages? Miners so far in 1950 have lost $146 million in wages. Coal production is 48 million tons under that of the comparable 1949 period. This means a loss in coal sales to the mine operators of approximately $240 million.

These losses are piled on top of those incurred during the last 10 months of 1949 when 110 of 254 possible work-days were lost through strikes or abbreviated three-day work-weeks.

150,000 Fewer Autos—Losses in the Chrysler strike also run high. The 150,000 automobiles that have not been built would have given Chrysler about $186 million in sales. Wage losses to the 89,000 Chrysler employees and the approximately 50,000 supplier employees laid off total about $8 million a week, or a total of $36 million to date.

The extent of the stresses set up in the national economy will depend on the duration of the stoppages. Economists say that if these strikes are not settled soon, they will revise downward their earlier estimates of production for the first half. Should the strikes continue for several more weeks, metalworking output would toboggan sharply.

Bright Prospects for GE

Shipments by General Electric Co., Schenectady, N. Y., in the first quarter are expected to be as high as in the same period in 1949, says Philip D. Reed, board chairman. If this goal is accomplished it will be "a mighty good job," he says, since GE's first quarter billings in 1949 totaled $389 million.

Large backlogs assure capacity operations through this year in divi-

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sions making heavy goods. Bookings of lighter goods such as radio sets, lamps, ranges and television sets are running well and operations are virtually at capacity. Cutbacks will be forced in these lines if steel supplies are shut off by the coal strike.

Television set production is at a peak of 10,000 units per week, about four times year ago levels. This rate will be increased to an amount not now determinable, Mr. Reed says.

TV Output High

Television set output in January was higher than in any 1949 month except November, reports Radio Manufacturers Association, Washington. Members of the association produced 335,588 receivers last month. Average weekly output was 15 per cent above December.

Radio production totaled 660,195 sets in January, about the same as the monthly average in the fourth quarter last year.

Philco Outlook Bright

Sales totaling about $75 million in the first quarter of this year are expected by Philco Corp., Philadelphia. New orders already received since Jan. 1 total more than $80 million. January sales were about 50 per cent better than a year ago and February is expected to show an even better comparison, says Courtnay Pitt, financial vice president.

For the year he sees at least an 8 per cent profit before taxes on sales topping $250 million. On this basis net earnings would amount to at least $12 million. In 1949 Philco sales were $215 million with net earnings after taxes ranging between $5 and $5.5 million depending on yearend adjustments.

The company expects to supply about 800,000 of the 4 to 4.5 million television sets the industry estimates will be sold this year. Philco also plans to increase its share of the 4 to 4.5 million-unit refrigerator market as compared to 1949. Mr. Pitt says his company's chances for increasing home freezer volume are good.

Admiral Aims High

This year should be the best in Admiral Corp.'s history, says Ross D. Siragusa, president. Last quarter 1949 set alltime highs in both sales and earnings.

The company is now producing television sets at a 700,000-unit annual rate and increased plant capacity under construction assures Admiral of the space required to make 1 million sets this year.

Mr. Siragusa sets Admiral's sales goal for 1950 at $200 million. He adds distributors have already released first quarter shipments in excess of $50 million, compared with $23.5 million in the same period last year.

Orders in the refrigerator division are running about 500 per cent ahead of the same period last year, he says, and credits this to the success of a new refrigerator line introduced in January.

MoPac Improves Facilities

Major items in Missouri Pacific Line's $5,399,600 capital expenditure program include the construction of a freight terminal in St. Louis at a cost of more than $1.5 million and installation of cab to caboose radios. The radio installation will be made in 53 diesel locomotives and 58 cabooses and will cost $164,000.

Extension of scientific controls required for operation of centralized traffic control on MoPac's Missouri Division will take an additional $218,000. Expenditures by Missouri Pacific were approved by the Federal District Court in St. Louis on petition of Guy A. Thompson, the railroad's trustee.

Air Brake Backlogs Gone

Backlog for air brake equipment of New York Air Brake Co., New York, is reduced to the point where future operations must depend primarily on new business, says Lowell R. Burch, company chairman. Air brake equipment for diesel locomotives has constituted a significant volume of sales and the company looks to the improvement in freight car orders as evidence of a probable pickup in the purchase of spare parts.

Replacement by the railroads of old K-type freight car brakes with new AB-type brakes was about 85 per cent complete at the end of 1949. This field is practically exhausted, Mr. Burch believes, because the remaining cars equipped with old type brakes will probably be retired instead of being converted.

National Product, Income in First Postwar Dip

GROSS NATIONAL PRODUCT declined to $257.4 billion in 1949 from $262.4 billion in 1948. National income dipped to $221.5 billion from $226.2 billion a year earlier.

In neither was the decline from 1948 more than 2 per cent. When allowance is made for lower prices in 1949, decline in output was slight.

First Postwar Decline—But the first half of 1949 saw the first general economic downtrend since the reconversion from war to peacetime production three years earlier.

Biggest differences in 1949 were in the inventory elements of national output. Net business inventory reductions in 1949 amounted to $2.5 billion, compared with net additions totaling $6.5 billion in 1948.

An increase in the flow of goods and services to final purchasers—domestic consumers, fixed capital investors, government and foreign nations—to $260 billion from $256 billion a year earlier helped keep the gross national product figure high.

Shift in the inventory position, the bulk of which occurred in the first half, was reflected in the business recession that developed at this time. Mildness of this recession—national income and gross national product declined less than 5 per cent from their late 1948 peaks—was traceable to the strength of final demand. In latter 1949 when inventory shifts were less pronounced, overall economic activity stabilized.

Manufacturing Drops—Among the nonagricultural industries, the largest absolute decrease in national income occurred in manufacturing (see table). Income in this industry which accounts for about 30 per cent of the national income fell by nearly $4 billion or 5 per cent. This reflected primarily the direct effects of the 1949 inventory recession on manufacturing. The only other major nonagricultural industries from which income originating fell in 1949 were the closely allied mining and transportation groups.

NATIONAL INCOME

BY INDUSTRIAL DIVISIONS	Billions of Dollars 1948	1949	Absolute Change	Percentage Change
Mining	4.9	4.1	− .8	−17.1
Contract construction	10.2	10.3	.1	1.1
Manufacturing	68.2	64.6	−3.6	−5.3
Transportation	12.2	11.8	− .4	−3.2
Communications, public utilities	5.9	6.6	.7	11.3
Government and enterprises	20.0	22.3	2.3	11.5
All industries, total	226.2	221.5	−4.7	−2.1

Department of Commerce

Men of Industry

RAY E. COPELAND

Ray E. Copeland was appointed general sales manager, **Southwest Steel Rolling Mills,** Los Angeles. **E. C. Thomas** assumes duties of works manager. Mr. Copeland was affiliated with Columbia Steel Co. as manager of sales, southern division.

—o—

Dr. William G. Theisinger was appointed regional manager of sales, **Lukens Steel Co.,** with headquarters in Houston, from where he will supervise activities of district sales offices and sales representatives throughout the South from South Carolina to California. For the last four years he was technical sales manager, with headquarters in Coatesville, Pa.

—o—

K. R. Knoblauch was named manager of sales, valve products, for the industrial division, **Minneapolis-Honeywell Regulator Co.** He continues headquarters at the Brown Instruments Division plant, Philadelphia.

—o—

Jack Godley was named Washington manager, **Nelson Stud Welding Division,** Morton Gregory Corp., Lorain, O. He was field engineer in the Washington district since 1948.

—o—

Dr. Donald W. Light, for the last eight years director of research, Ludlow Mfg. Co., Ludlow, Mass., was appointed director of research, **Angier Corp.,** Framingham, Mass.

—o—

E. Allan Williford was appointed general manager and a vice president, **Link Aviation Inc.,** Hillcrest, N. Y. **George W. Emerson** retires as a vice president, but continues in a consulting capacity. Mr. Williford was general manager of the Ansco operations, Binghamton, N. Y.

H. C. WEIDNER JR.

H. C. Weidner Jr. was named general superintendent of manufacturing operations, **Townsend Co.,** New Brighton, Pa. He succeeds **Harry Goodwin,** who will continue in advisory capacity and as director of research and development.

—o—

Oliver J. R. Troup Jr. was appointed sales engineer, **Atlas Chain & Mfg. Co.,** assigned to eastern Pennsylvania, New York and Maryland.

—o—

Erskine W. Manterfield was appointed director of public relations and advertising, **American Locomotive Co.,** New York. He succeeds **Holmes Brown,** resigned.

—o—

Ludwig Emde was elected president and general manager, **Temprite Products Corp.,** Detroit, succeeding **W. R. Clark** who becomes chairman of the board. Re-elected secretary-treasurer was **P. Fred Lesley.** Mr. Emde left Worthington Pump & Machinery Corp. about five years ago to join Temprite as vice president and general manager, and has been directing its expansion program.

—o—

Alfred H. Sachs was elected president, **Smith-Victory Corp.,** Buffalo, to succeed **Milton Strauss. Leon Cooper** was named vice president.

—o—

Leon A. Blum was appointed sales manager, San Francisco plant, **Federated Metals Division,** American Smelting & Refining Co. He succeeds **Forest A. Wahlheim,** retired. **Donald H. Beilstein** was made assistant plant superintendent.

—o—

D. Paul Hoover, production manager, **Standard Duplicating Machines Corp.,** Everett, Mass., was elected vice president and re-elected a director.

—o—

John L. Taylor was appointed sales manager, **Edwards Co. Inc.,** Norwalk, Conn.

—o—

Charles M. Kay was appointed division superintendent of steel works, South Works, Worcester, Mass., **American Steel & Wire Co.,** subsidiary, U. S. Steel Corp. He succeeds **U. F. Corsini.**

—o—

J. H. Walker, assistant credit manager, was appointed assistant treasurer, **Bethlehem Steel Co.,** Bethlehem, Pa.

—o—

William F. MacDonald was elected president, **E. F. Houghton & Co.,** Philadelphia. He will temporarily continue as treasurer. Mr. MacDonald succeeds **Maj. Aaron E. Carpenter,** who voluntarily relinquished the presidency and was elected chairman of the board of directors. By-

LUDWIG EMDE

WILLIAM F. MacDONALD

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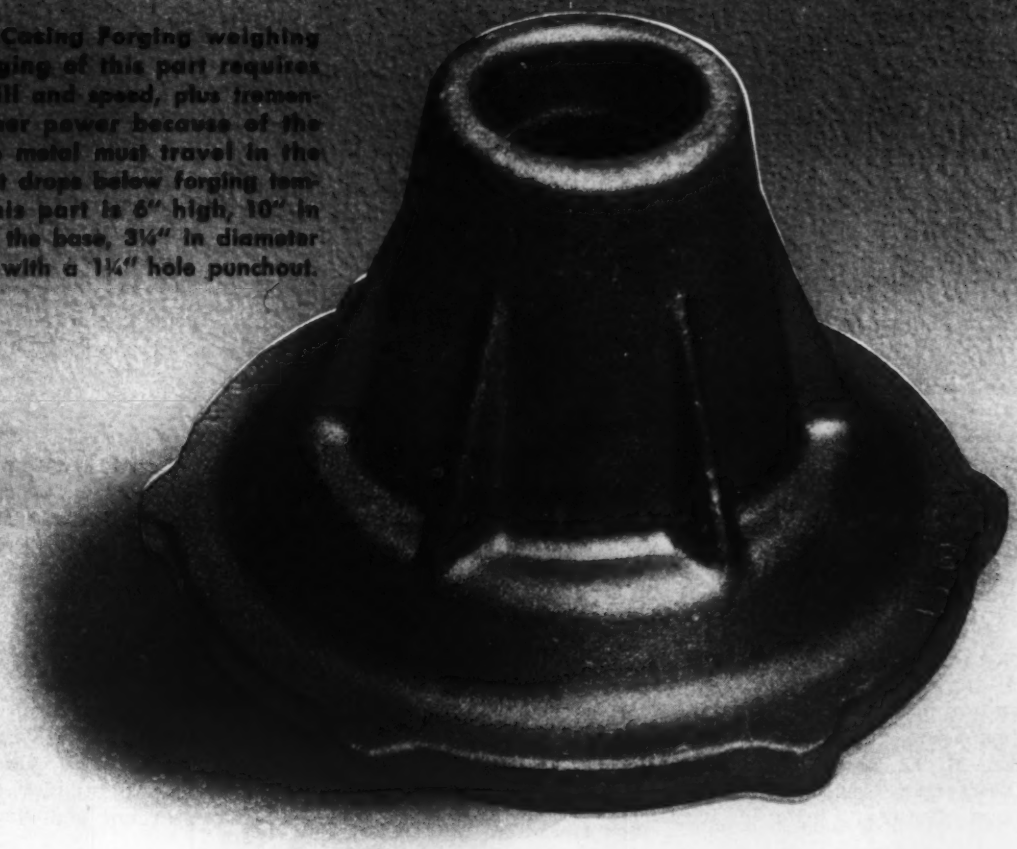
TRANSUE FORGINGS

USUALLY COST LESS AT THE POINT OF ASSEMBLY



Differential Casing Forging weighing 22 lbs. Forging of this part requires unusual skill and speed, plus tremendous hammer power because of the distance the metal must travel in the die before it drops below forging temperature. This part is 6" high, 10" in diameter at the base, 3¼" in diameter at the top, with a 1¼" hole punchout.

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OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

laws provide that Major Carpenter shall still remain chief executive officer of the company. **Dr. James T. Eaton,** manager of research, was elected a director.

—o—

A. O. Smith Corp., Milwaukee, in a move to enlarge its service to motor

D. L. MILLS

customers, has contracted for new manufacturing and supply facilities. Whirl-A-Way Motors Inc., Tipp City, O., will manufacture Smithway fractional horsepower motors to specification, to serve the eastern region. **D. L. Mills,** president of Whirl-A-Way, was appointed eastern regional sales manager, motor division, with headquarters in Dayton, O. Eastern sales managers reporting to Mr. Mills are **H. E. Rowland,** Dayton; **J. P. Hoffberger,** New York; **R. O. Dehlendorf,** Chicago.

—o—

Dean Uhll, western division service manager, was named export service manager, **Caterpillar Tractor Co.,** Peoria, Ill., which appointment relieves **Ralph G. Dunn,** assistant general service manager, who has served as export service manager in addition to carrying other administrative duties. **Harrison Welch,** eastern division service manager, succeeds Mr. Uhll, and in turn is succeeded by **D. L. Lammers.**

—o—

Chemical division, **Kaiser Aluminum & Chemical Sales Inc.,** Oakland, Calif., has established a new Southwest sales district with headquarters in City National Bank Bldg., Houston. **R. L. Petersen** heads the district. **J. T. Putnam,** who headed the Pacific Northwest territory, assumes charge of the Los Angeles sales area. **R. M. Olive,** formerly superintendent, Diamond Division plant in Seattle of Permanente Cement Co., will head the Seattle district, and in addition will handle rotary kiln refractory sales in eastern United States through the company's Akron office.

—o—

Hiram B. Young, formerly superintendent, Niagara Falls, N. Y., plant, was made works manager, **Hooker Electrochemical Co. Frank W. Dennis,** personnel director and employment manager, was named director of industrial relations for plants at Niagara Falls, Tacoma, Wash., and subsidiary Hooker-Detrex plants at Tacoma, and at Ashtabula, O. **Leonard F. Bryant** was appointed plant superintendent, and **Walton B. Scott,** technical superintendent.

—o—

Robert F. Dick was appointed administrative assistant, **Illinois Tool Works,** Chicago, and will assist

ROBERT F. DICK

Calmer L. Johnson, vice president and treasurer. Mr. Dick was a vice president of George Fry & Associates, consulting management engineer, Chicago and New York.

—o—

Wolverine Tube Division, Calumet & Hecla Consolidated Copper Co., established a new sales office in Room 703, 81 Madison Bldg., Memphis, Tenn. **M. J. Cook,** Wolverine representative, will headquarter in the new office. **Arthur W. Retzel** was appointed division sales representative with headquarters in Philadelphia.

—o—

Bechtel Corp. appointed **George Gibson** as manager of its new office, Philtower building, Tulsa, Okla.

—o—

Ressler A. Dusseau was appointed manager, engineering cost control department, **Automatic Transportation Co.,** Chicago.

—o—

Rapids-Standard Co. Inc., Grand Rapids, Mich., promoted **Claude V. Meconis** to advertising manager, succeeding **Crosby Kelly,** recently appointed executive manager, Chicago Lake Front Fair. **Harvey M. Rasmussen** was appointed assistant sales manager for Rapids-Standard.

—o—

Huck Mfg. Co. promoted **Robert N. Hendricks** to vice president-sales engineering, and appointed **Frank A. Dobbe,** vice president-sales.

—o—

S. A. Ott has joined the metallurgical sales department, **Dacar Chemical Products Co.,** Pittsburgh, as director. He formerly was chief metallurgist of Penn-Ohio Steel Co.

—o—

Lorin G. Miller, dean, College of Engineering, Michigan State College, was named engineering consultant by **United States Radiator Corp.,** Detroit.

—o—

John L. Mortimer, assistant vice president and assistant general manager in charge of sales, **Foster Bros. Mfg. Co.,** Utica, N. Y., has resigned.

—o—

Institute of Scrap Iron & Steel Inc., Washington, appointed **Irving Levin,** Superior Iron & Metal Co., chairman of the finance committee, and **Herman Caplan,** M. W. Singer & Co., chairman of the seminar committee.

—o—

F. J. McNiff, connected for 17 years with operating and sales management, Industrial Steels Inc., Cambridge, Mass., has joined **Crucible Steel Co. of America** as representative of stainless steel sales, Atlantic seaboard and New York.

—o—

J. F. Black has joined **Youngstown Sheet & Tube Co.,** Youngstown, as

J. F. BLACK

assistant general superintendent of the steel plant, Indiana Harbor Works, East Chicago, Ind., and **Arthur Grund** was appointed assistant superintendent of rolling mills.

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JOHN H. ELLIOTT

ARNO L. BILLETER

BERNARD DOLAN

John H. Elliott was appointed assistant general manager of operations, **Carnegie-Illinois Steel Corp.**, subsidiary, U. S. Steel Corp., Pittsburgh. **Arno L. Billeter** succeeds Mr. Elliott as general superintendent, Irvin Works, near Dravosburg, Pa., and **Albert J. Berdis** was named assistant general superintendent. **Albert T. Reichenbach** succeeds Mr. Berdis as superintendent, Vandergrift plant. **James D. Rollins** was promoted to assistant chief engineer, Carnegie-Illinois. **Norman C. Michels** was appointed planning engineer to succeed Mr. Rollins, and **Harry C. Hunter** was named contract engineer.

—o—

R. B. Church Jr. was appointed assistant to the district manager, and **B. M. Gatling Jr.**, central station division manager, **Westinghouse Electric Corp.**, both to be located in Atlanta. **Frank E. Bodine** was named assistant central station manager, Pacific Coast district, San Francisco, serving electric utility customers.

—o—

W. L. Tomlinson was promoted to manager, automotive glass sales, **Pittsburgh Plate Glass Co.**, Pittsburgh. He served as Detroit district manager of industrial glass sales.

—o—

F. R. Burnette was appointed assistant vice president-engineering, **United States Steel Corp. of Delaware**, Pittsburgh. He will have special duties in connection with future construction programs of the corporation.

—o—

J. E. Ryan and **C. P. Hayes** were appointed staff assistants to **B. A. Case**, manager of engineering, small apparatus divisions, **General Electric Co.**, Schenectady, N. Y.

Bernard Dolan, formerly manager of merchandising, **Peter A. Frasse & Co.**, New York, was appointed manager of sales, and in addition will continue to direct the company's advertising and sales promotion.

—o—

William B. Yeager was elected vice president, secretary-treasurer and a director, **Menasco Mfg. Co.**, Burbank, Calif., succeeding **G. Preshaw**, resigned. **Janet Foulkes** was elected assistant secretary.

—o—

J. S. Morgan, engineer in charge of sales, switchgear and control sections, electrical department, **Allis-Chalmers Mfg. Co.**, Milwaukee, was named manager, switchgear section. He succeeds **Frederick C. Ludington**, since 1946 manager, switchgear and control sections, who continues as manager, control section.

OBITUARIES...

William W. Rose, 66, for ten years executive vice president, **Gray Iron Founders' Society**, died Feb. 20 at Marine Hospital, Baltimore. He joined the society in 1936 following years spent with various companies in executive posts both in this country and abroad. He retired in 1945 due to ill health, but continued residence in Washington.

—o—

Henry D. Eisengrein, 57, vice president and general manager, **Ward LaFrance Truck Corp.**, Elmira, N. Y., died Feb. 15.

—o—

George P. Thomas, 56, purchasing agent, **Frederic Flader Co.**, Tonawanda, N. Y., died Feb. 16.

—o—

Richard Armstrong, chief metallurgist, **Pittsburgh Steel Foundry Corp.**, Glassport, Pa., died at West Penn Hospital, Pittsburgh, Feb. 17. He formerly was associated with Algoma Steel Co. of Canada, and Canadian Steel Foundry, Montreal.

—o—

Raymond H. Cone, 55, director, **Cone Automatic Machine Co. Inc.**, Windsor, Vt., died Feb. 19. He was a son of the late Frank L. Cone, founder of the company, and for many years prior to retirement in 1936, was engaged in engineering work with the Cone organization.

—o—

John B. Rice, 75, who retired in 1940 as manager, San Francisco office, **Hercules Powder Co.**, died Feb. 12.

—o—

Alfred D. Edwards, 82, chairman, **Woodruff & Edwards Inc.**, Elgin, Ill., died recently. He organized the foundry company 47 years ago.

—o—

G. Earl Jones, 68, who represented **Lovejoy Tool Co. Inc.**, Springfield, Vt., for 22 years in Michigan, died Feb. 12 in Holland Hospital, Holland, Mich. For the last two years he covered only western Michigan and the Toledo, O., area.

—o—

William C. Taylor, 57, North Carolina sales representative, **New York & New Jersey Lubricant Co.**, died Feb. 5. at his home, Greensboro, N. C.

—o—

William P. Sieg, founder and former president, **Titan Metal Mfg. Co.**, Bellefonte, Pa., died Jan. 27.

—o—

Carl G. Naylor, 70, president, **Naylor Pipe Co.**, Chicago, died Feb. 13. He founded the company in 1924 and was instrumental in development of spiralweld steel pipe.

—o—

Charles L. Neuner, 52, superintendent, steel conditioning and inspection department, **Republic Steel Corp.**, Chicago, died Feb. 9.

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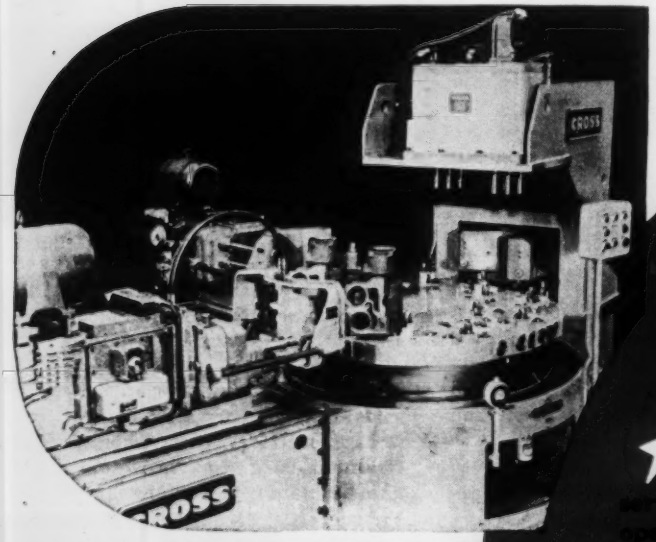

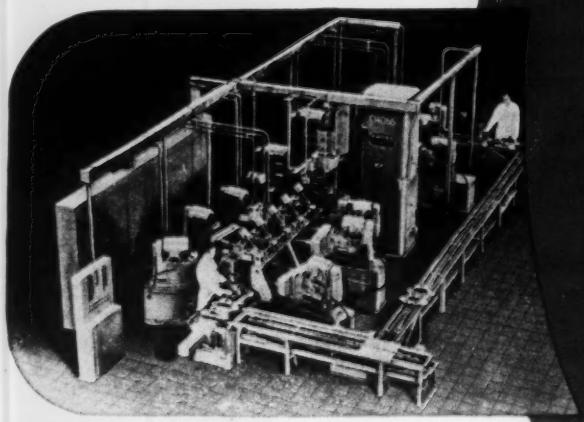

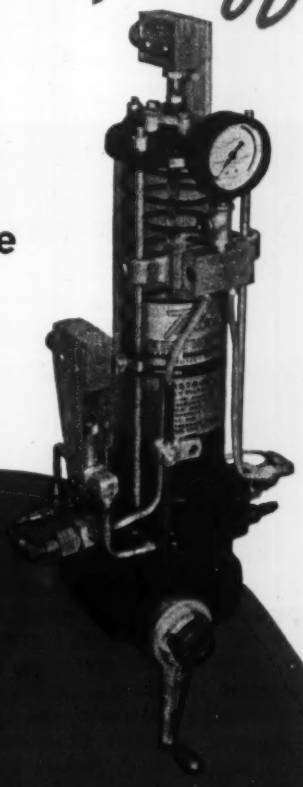

More than 120 points of lubrication are served by a Trabon automatic system on this operation — The Transfer-Matic machine manufactured by Cross Company of Detroit — where precision-like workmanship requires positive lubrication at all times.

Trabon systems are widely used in the automotive industry. Trabon systems make it impossible to skip or underlubricate a bearing or gear... Trabon systems need only one indicator at the pump . . . are completely sealed with no exposed moving parts . . . dirt, dust, moisture, abrasive grit — all are barred from a Trabon lubricating system.

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Production AND Engineering
NEWS AT A GLANCE

TWO-POINT CONTROL— Completely mechanized handling in Scovill Mfg. Co.'s new brass mill line at Waterbury, Conn. makes it possible for two operators to manipulate the bar on both sides of the mill, and to regulate roll speed and gage —all from two control desks. System makes use of vacuum pilers and unpilers traveling over the entry, delivery and transfer tables. These units each consist of a series of suction disks mounted on a structural supporting member which is motivated hydraulically. By means of these suction devices the ton weight pieces are easily moved from point to point.

RESEARCH BOOSTER—Two independent and rapid phenomena occurring simultaneously such as speed and vibration now can be analyzed quickly by an electronic development reported by Electronic Tube Corp., Philadelphia. The two variables are brought together for comparison on a single oscilloscope as two separate traces.

"MUSCLES" ARE THERE—Purchasers of copper-base casting sometimes are inclined to regard them as being rather low in strength or at least unsuited to applications in which high strength is required. Such general conclusions, Apex Non-Ferrous Foundry reports, are misleading. The Cleveland concern says some copper-base alloys have an ultimate tensile strength rivaling that of steel. Several have tensile strengths of 65,000 pounds per square inch or better. And some alloys even range from 90 to 110,000 psi in ultimate tensile strength.

AIDS DEEP DRAWING—Very tough draws can be handled by a compound developed by Northwest Chemical Co., Detroit. The product is a complex, semiplastic composition that maintains its inherent physical properties during repeated forcible stamping of ferrous and nonferrous alloys. Its film strength is so high that it does not separate even under intense stresses. The compound air dries within minutes and force dries in seconds. It is applied by brush, spray, roll or dip.

COLD-PROOF STEEL—An alloy steel capable of fulfilling extraordinary engineering requirements of subzero service at operating temperatures as low as minus 423° F is reported by Lebanon Steel Foundry. Containing 19.50 per cent chromium and 9 per cent nickel among other alloying constituents, the austenitic cast ferrous alloy showed no structural changes down to minus 423 degrees in hundreds of laboratory impact tests from production lots of castings. It already is being used effectively as castings for pressure equipment in storage facilities for liquid oxygen employed as a propellant for rocket engines.

"CHUCKING" WEIGHT—If you have a weight problem that cannot be solved by redesigning it might be easier to develop a new material. That's what Whiton Machine Co., New London, Conn., did in eliminating excessive weight in the construction of its chucks. After considerable experimenting and testing, the company developed a material consisting of a special analysis, heat treated aluminum alloy which possesses all the strength and wearing qualities desired. Jaws, wedge and wedge bushings of the chucks are of alloy steel but forgings for body construction are of the new alloy.

PRODUCTION BOOSTERS—In face of today's rising wages, production costs and high taxes, solution to current manufacturing problems is not easy. On the production line, however, one method still remains to be fully exploited in obtaining more work for less effort. That is greater use of power tools as a substitute for handwork. Pneumatic power tools have long been used widely for industrial and construction applications. But some newcomers in the field, electric impact tools, are proving to be time-and-labor savers in production and maintenance work. (p.58)

MORE SENSITIVE—Primary difficulty encountered in x-ray measuring stress or strain in metals is lack of sensitivity. This, it is pointed out, is due to the small change in diameter of the diffraction ring with change in stress, and diffuse nature of the ring. Development of a "photomicrometer" by John A. Bennett of the National Bureau of Standards overcomes this difficulty. New instrument is reported to measure diffraction patterns directly. (p.64)

SPLITS TOOLING COSTS—One of the big reasons why the Marform process provides production savings is it eliminates necessity of using a female die, pressure plate or drawring. The forming method utilizes the same simple male punch employed in the Guerin process but no female die. Elimination of this die saves more than half of the cost of the tool in many cases for several reasons. One is that the female portion of the tool is often the most difficult to make. (p.66)

MORE TURBO-HEARTH DATA—Mechanical properties of steels produced by the turbo-hearth process place them in the same limits as open hearth steel of the same composition, a report from Battelle Memorial Institute reveals. The method, which promises quality steel in 12 minutes, makes use of standard basic pig iron as raw material. It oxidizes carbon to below 0.03 per cent, and both manganese and silicon below 0.01 per cent. Nitrogen can be maintained at about 0.003 per cent, and up to 97 per cent of the phosphorus and up to 50 per cent of the sulphur can be eliminated. (p. 72)

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How To CUT

By A. G. RINGER
Application Engineer
Portable Power Tool Division
Ingersoll-Rand Co.
New York

TODAY an industrial revolution is taking place. Wages are steadily increasing; production costs are high. Corporate taxes are rising; buyer resistance is mounting. The pinch is coming from all sides. Economic conditions now demand greater production at lower costs, and time-saving in maintenance operations.

Solution to today's manufacturing problem is not easy. At least part of the answer lies in mechanization. The goal of more work with less effort can be achieved through the greater use of power tools as a substitute for handwork.

Fig. 1—Tapping is a familiar operation in fastenings assembly, and a natural operation for this reversible electric impact tool. The popular range of sizes from ¼ to ½-inch is easily handled. With motor reversed, tap can be backed out without any trouble. Stripped threads on a refrigerator compressor body are being repaired here

Pneumatic power tools have long been widely used for industrial and construction applications. Some of these tools operate on the continuous torque principle; others operate on the intermittent torque, or impact principle. Newcomers to the power tool field are electric impact tools, which have proved themselves time and labor-savers in both production and maintenance work, especially in fastener assembly. The electric Impactool originated by Ingersoll-Rand Co., New York, is an outgrowth of the air-operated impact wrench that was introduced in 1933 and that has been widely adopted for speeding up bolting and similar work.

Special advantages of impact tools—both air and electric—for fastener assembly lie in four features: (1) Extra power which is automatically provided whenever resistance is met; (2) motor burn-out is eliminated in the electric tool—even if the spindle stalls completely; (3) absence of torque reaction to the operator; and (4) ability to tackle jobs which cannot be performed with regular air-powered or electric tools. Fastening applications in which it may be used are nut-running and removal; driving and removing screws and studs; and extracting broken cap screws and studs. With various standard accessories.

Fig. 2—Over 1000 screws (about 10 gross) are used in assembling this pattern for a cutter's spider for dredging. About 15 hours are saved on the work through use of the electric impact tool. Screws ¼-inch in diameter and 2, 3 and 5 inches long are required

Fig. 3—In the cleat assembly of the tractor, the electric tool is fitted with a 13/16-inch socket to run down the hex nuts. Changing or repairing the cleat is also an easy matter. Even when rusted or frozen on, the nut can be removed in a matter of seconds

Fig. 4—Applying 80 square nuts in the assembly of an ash gate is done in two-thirds the usual time with the electric impact tool. At one plant, the foreman estimates use of the tool increases shop capacity by one-third, by moving jobs through faster. In addition, the tool with appropriate attachments is used for tapping and reaming and for studding cylinders of the ash gate

ASSEMBLY COSTS

. . . with power impact tools

it will also drill metal, brick and masonry; drive wood augers; ream and tap.

Extra Power—In some operations, such as the removal of rusted or frozen nuts, it is frequently impossible to remove the nut without considerable time and resultant increased costs. With impact tools, both air and electric, the job can be done in a matter of seconds. This is true because the resistance offered by the frozen nut winds up the patented spring impact mechanism and the spring, when released, delivers thousands of rotary impacts per minute—a source of extra power which spins off the nut quickly and easily. Because the motor is reversible, this power can be used to drive or remove fasteners at the operator's will, merely by a twist of the wrist. Consequently, maintenance and repair time is greatly reduced.

Motor burn-out for the electric impact tools is the type of failure which increases time off the job and is a profit snatcher in fastener assembly work. This source of trouble is eliminated with impact tools because even if the spindle is stalled completely, the motor continues to run at normal speed.

No Torque Reaction—Because of the nature of the impact mechanism, the operator feels no torque reaction or twisting. No kickback is transmitted to the hand. This feature greatly reduces operator fatigue and also makes it possible to hold the tool with one hand, and thereby reach into inaccessible places, when necessary. Streamlined housing on the tools permits ready introduction into confined spaces or close to side walls.

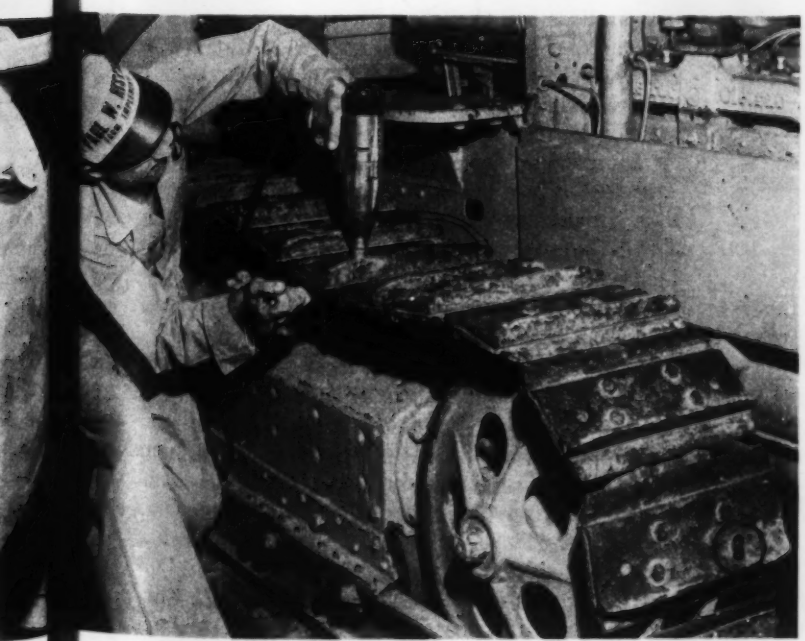
Tapping is an operation frequently employed by manufacturers in assembly operations. It is both quick and easy to tap threads with the tool and then, by reversing the motor, back the tap out of the hole.

Electric-Driven Applications — A farm equipment dealer estimates that the electric tool saves him about 50 per cent or more of the time on each tractor assembly job. Cleats on each tractor have approximately 500 bolts. It takes 10 man-hours, or more than a day's work with an ordinary hand wrench to set and tighten these bolts. Doing the work with the electric-powered impact tool takes only between 4 and 5 hours, and cuts assembly time in half.

Known time-saving industrial applications of the electric tool are found in such widely different fields as gate assembly, in the production of materials handling equipment; maintenance and construction of dye cages in textile mills; production and repair of refrigerators; and pattern assembly and disassembly in foundry pattern shops. Electric tools also have a number of applications in the automotive field. In cleaning and repair operations, they are used for removing and applying nuts on wheels, cylinder heads, springs, and shock absorbers.

In one operation in the construction of materials handling equipment, involving ash gate assembly, the shop foreman estimates that the use of the electric tool increases shop capacity (*Please turn to Page* 90)

From data published by the Industrial Fasteners Institute, Cleveland, in *Fasteners*, 6, 2.



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HOT Machining . . .

Probably not "revolutionary" but nevertheless destined to speed up production of hard, tough parts, novel system foreshadows distinct types of "heating-cutting" machine tools

BY GUY HUBBARD
Machine Tool Editor, STEEL

SINCE the days of Tubal Cain it has been a well recognized fact that metals softened by heat more easily can be forged, formed and cut than metals in the normal cold condition. That underlies the ancient and still highly important art of forging, and for a long time it has been taken advantage of in certain kinds of metal cutting—not only shearing but also in cutting by tools which remove metal in the form of chips.

One long standing example of the last mentioned technique is the hot sawing of billets in steel mills. In that case advantage is taken of the fact that billets "in process" naturally are at high temperature, to cut them by circular saws at a rate of speed comparable to sawing logs of wood.

Were it not for the fact that hot workpieces and precision machine tools constitute what on the face of things seems to be a rather incompatible combination, and the added fact that carbon steel or high speed single point tools or even multiple blade milling cutters "don't mix" with high heat, it is probable that hot machining in lathes and milling machines might have been undertaken many years ago.

Be that as it may, it has remained for several bold experimenters to await the advent of carbide tooling before coming out with public announcements of hot work machine tool operations which seem to hold practical possibilities.

None of these experimenters claims that heat is going to be the universal solvent for all machining problems. None claims that it will be useful very far beyond the field of tough, hard metals which in their cold state are practically unmachinable in lathes or milling machines. More and more such materials are being used in gas turbines and similar applications.

None of these experimenters claims that he has as yet solved all the problems of getting the heat into the work without getting it into the machine tool. None has solved all the problems of keeping down the cost of heating so that it does not run up the cost of the work considerably above cold machining of ordinary materials. However, all of them have made headway which foreshadows considerable practical use of the method and all of them deserve praise for their ingenuity and for their public spirit in making their methods known.

Among those who deserve to be mentioned in this connection are Joseph B. Armitage, Dr. A. O. Schmidt and J. R. Roubik of Kearney & Trecker Corp., Milwaukee; and Sam Tour, L. S. Fletcher and L. T. Friedman of Sam Tour & Co. Inc., well-known consulting engineering organization in New York. Patent records indicate that a number of others have been and are working along similar lines—as also are a number of specialists in gas and electrical induction heating. However, the gentlemen above named are the ones who thus far have discussed their activities most freely.

My own introduction to this interesting departure from the stereotyped "art of cutting metal", came about during the 1948 annual meeting of American Society of Mechanical Engineers in New York. The man who initiated me into the mysteries was Joseph B. Armitage, vice president in charge of engineering, Kearney & Trecker Corp. Mr. Armitage touched on this subject from an experimental rather than a practical technique in a paper prepared jointly by himself and Dr. A. O. Schmidt, research engineer of the company. This paper is entitled "Influence of Steel Hardness in Face Milling".

Toward the end of this paper comes the following now significant statement:

"In another series of machining tests a die block was heated in a furnace to 1800° F and then mounted in an insulated fixture on the milling machine table. The milling of this heated die block started when the block was about 1500° F, as determined by comparison with a heat color chart and the temperature continued to drop slowly as the tests proceeded.

"Power required, as measured by a wattmeter ranged from about 1½ hp at 4 inches per minute feed up to about 3½ hp at 12 inches per minute feed. This compared to a little over 6 hp at 4 inches per minute feed up to about 9½ hp at 12 inches per minute feed on the cold block prior to heating. (Editor's note: These values have been read from a chart which accompanied the original paper.)

"Due to the interrupted type of cut in milling, tool life is comparatively good when machining a heated

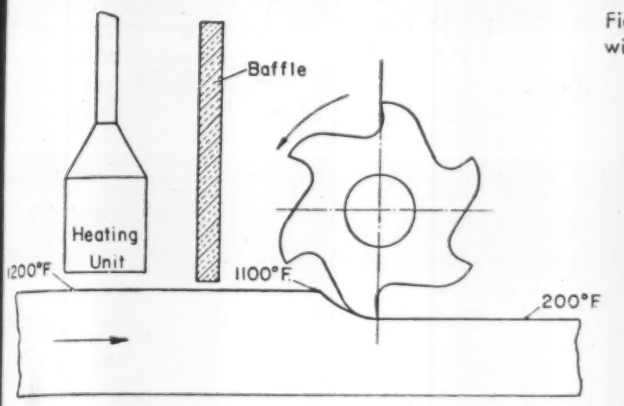

Fig. 1—Diagram of Kearney & Trecker setup for hot milling steel with gas torch surface heating metal directly ahead of cutter. Courtesy American Society of Tool Engineers

workpiece, because each tooth has a chance to cool in the air between its cuts. While changes in microstructure and accuracy in the workpiece are unavoidable under these conditions, a difficult milling job can be made easier this way.

"Care should, of course, be taken to provide proper protection against the heat flow from the workpiece into the machine, either by insulating with layers of asbestos or by circulating coolant in the table or fixture."

My next personal experience with hot machining came about at the semiannual meeting of American Society of Tool Engineers at Montreal on October 28 1949. Between the time of the ASME meeting already mentioned and this session in Canada, a considerable amount of scientific research and practical experimentation had been carried out at the Kearney & Trecker plant. This was neatly "rolled up and packaged" in a paper by Dr. Schmidt and J. R. Roubik, the latter being lecturer in mechanics at Marquette University as well as a member of the Kearney & Trecker research department.

In the absence of Dr. Schmidt on a European trip, this paper—entitled "Milling Hot Work Pieces"—was ably presented by Mr. Roubik. I quote the following highspots from this paper: "Since basically a machine tool is the inverse of a heat engine and is supplied with mechanical work which is converted into an equivalent amount of heat in the tool, chips and workpiece, the less heat the machine tool is required to produce, the easier the metalcutting operation becomes.

"There are four different ways to machine heated workpieces. (1) Preheating the workpiece in a furnace and then machining it, meanwhile insulating or cooling the holding device so that not too much of the heat is transferred into the machine tool. (2) Machining workpieces while they are still hot from other manufacturing processes, for example, steel billets in a rolling mill and forgings or castings before they have cooled to room temperature.

"(3) Heating the workpieces on the machine tool either by induction or with gas immediately before the cutting operation. (4) Surface heating the workpiece on the machine for milling plane surfaces, heat being applied to the top layer of the material only—the resulting machined surface thus being relatively unaffected by the heat.

"A large number of slab milling tests using the fourth method have been conducted on a Kearney & Trecker bed-type miller as well as on a knee-type machine. A Goddard & Goddard slab mill cutter 5 inches in diameter and 4 inches wide, with eight Tantung-tipped teeth was used. Workpiece was a flat steel plate of SAE 4340, 280 Bhn. Its surface was preheated by 3½-inch wide Airco water cooled flat surface torch. Pieces of asbestos board were used for insulation and for shielding cutter and spindle nose. This setup is shown diagrammatically by Fig. 1.

"Before table feed was engaged, torch was lighted and flame adjusted while spindle was running. Feeds used in these tests were 50 and 60 inches per minute with spindle speed of 180 rpm which is equivalent to 236 feet per minute cutting speed.

"Heat supplied by the torch was sufficient to heat the surface of the workpiece to around 1200° F. This softened the top layer of the material and cushioned the shock when the milling cutter teeth entered the work. Temperature of the work surface at point of engagement with cutter—which was several inches away from the torch—was about 1100° F.

"Typical reductions in horsepower are as follows. With depth of cut 0.200-inch and feed of 30 inches per minute, 30 hp was required to mill the piece at room temperature. With the same depth of cut and same feed, less than 20 hp was required to machine the preheated metal. On another run with 0.380-inch depth of cut and 20 inches per minute feed, the power ratio was 30.66 hp against 20.66.

"There was no discoloration or temper color on the finish milled surface of the steel. This indicated that temperature in the body of the workpiece actually was below 350° F during the hot machining cycle. Microscopic examination revealed no difference between the microstructure of a piece machined at room temperature and one with surface preheated for machining."

As far as tool materials are concerned, the Schmidt and Roubik experiments showed that high speed steel cutters fail very quickly under hot milling conditions, sintered carbides remain comparatively hard at high temperatures and therefore stand up quite well and that cutters having teeth of the cast cutting materials turn out particularly good performance.

Overall conclusions on the basis of their extensive experiments to date are as follows: "Hot milling, or milling a workpiece whose outer surface layer has been softened by application of heat, quite obviously is not indicated as a desirable machining method when other more established procedures prove expedient. Application of this technique at the present time is limited to operations that cannot be performed practically or economically by the more common methods.

On the basis of extensive practical experiments sponsored by the United States Navy and carried out

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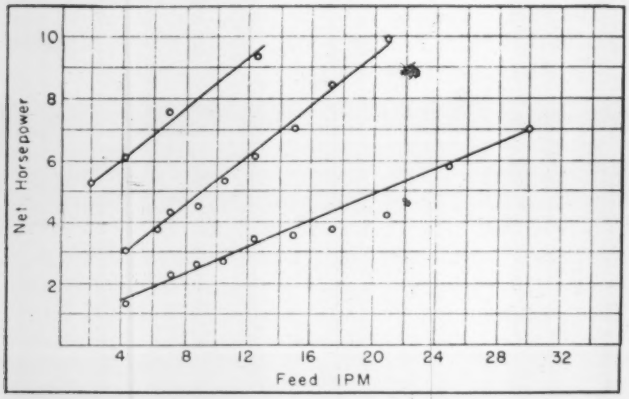


Fig. 2—Graphical presentation of Kearney & Trecker determinations of power required to mill steel die block. Upper line is as received, lower when heated to 1500° F, center following cooling to room temperature. Courtesy ASTE

in the laboratories of Sam Tour & Co. Inc. in New York, Mr. Tour and his research associates have worked up considerable enthusiasm for a technique which they call "hot spot" machining.

In a quite extensive revelation of the method made by Mr. Tour at the previously mentioned Montreal meeting of ASTE, pictures were shown of a setup consisting of a LeBlond Regal lathe and a Tocco induction heating machine. On this interesting bar machining job the work was chucked at the headstock end and supported by a center at the tailstock end.

Mounted on the lathe carriage immediately ahead of the single point turning tool, was an induction heating coil which surrounded the bar and had hole diameter slightly larger than the bar. This coil was fed from the Tocco unit as soon as the lathe was started and the longitudinal feed engaged.

In a letter, Mr. Tour explains the action to us in the following words. "As rapidly as the area of metal immediately ahead of the tool is heated—and before the heat has penetrated to great depth in the work—the heated metal is cut away by the tool.

"Power required in metalcutting is consumed in shearing the metal, in deforming the chip and in friction against the tool surface. Shear strength of metal decreases with increase of temperature. Hardness or resistance of metal to deformation also decreases with increase of temperature. Therefore by increasing the temperature of the work being cut, forces necessary to shear off and to deform the chip are decreased. Pressure on the point of the tool also is decreased, and same is true of friction on the tool.

"These decreases in pressure and friction materially decrease tool wear. Tool edge breakage due to excessive pressure on the tool is eliminated. Cemented tungsten carbide tools are not affected by heat involved in the preheated work, heat evolved by cutting action or heat in the chip being formed.

"Low carbon, medium carbon, chromium, nickel and nickel steels have been turned by this technique at three to four times the rate of metal removal per minute possible on the same lathe working on metal at room temperature. The high temperature resistant cobalt-chromium jet engine and turbine alloy known as S816 has been turned by the hot method in a 5 hp lathe at 0.187-inch depth of cut and 0.015-inch feed, at the rate of 134 surface feet per minute.

"That represents metal removal at a rate more than 100 times that possible at room temperature. The special carbide tools by which this was accomplished remained unaffected after removal of many cubic inches of this S816 metal. Stainless steel and rolled K Monel metal readily can be machined by this hot method."

As in the case of such earlier techniques as "climb milling", "super-speed milling", "flywheel-impelled milling" and "negative rake machining"—hot machining is a rather sensational method and has aroused widespread interest. Many people now are experimenting with it, proponents both of gas and electrical induction heating methods actively are exploring the possibilities and a number of machine tool builders are looking to it as a possible stimulant to sales.

Research men in the gas and electric heating industry also are working to develop methods of concentrated application of the heating effect which will eliminate the now troublesome "heat splash" and which will reduce the now considerable cost of this "in machine tool" heating.

In the meantime it has come to light that experiments and even practical applications of the system have been going on quietly for a number of years and that a considerable number of patents covering various systems either have been granted or now are "in the works".

These patents involve machining of completely heated workpieces, combinations of gas flames with cutting tools, combinations of induction units with cutting tools and even a system wherein heat is generated right at the cutting edges of a tool by introducing low voltage current into the tool and grounding it through the teeth into the workpiece. It has even come to light that two Russians named Babat and Tosinsky were engaged in hot machining activities prior to 1940. My impression is that there is going to be some keen scrutiny of the "prior art" and that eventually there may be some patent contests—as is common in situations of this nature.

In the meantime, it must be remembered that most of the hot machining setups to date have been in the nature of makeshift combinations of existing standard machine tools and existing gas and induction heating devices. That too is a common condition at a comparable stage of any new industrial art. However, if history repeats itself, that condition will not last very long.

With substantial researchers, machine tool builders and gas and electrical heating unit manufacturers becoming interested, it should not be long before pooling of know-how—and possibly of patents—on the part of these various groups who have quite a stake in this, will result in new and efficient co-ordinated heating-machining units. These eventually will take their place in production lines as recognized members of the ever-growing "American machine tool family".

Single Spindle Automatic

Designed for use with carbide or high speed steel tooling

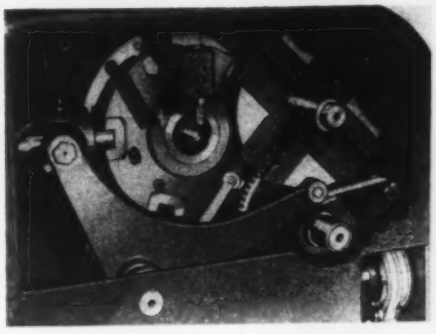


Fig. 2—Upper part of outboard support opened up to show turret indexing and locking mechanism

By GUY HUBBARD
Machine Tool Editor, STEEL

MAJOR feature of the in-plant machine tool exhibit staged recently by National Acme Co., Cleveland, was a new design of single spindle automatic for bar work up 4¾-inches—first of a series which also includes machines of 2⅝, 3½ and 5½-inch bar capacity.

Particular significance of this machine is that it marks the active re-entry into the single spindle field of a company which for several years allowed this type of automatic to lie dormant—in the meantime specializing primarily on 4, 6 and 8-spindle machines. Possibilities opened up by carbide tooling explain the revival of the "singles" on the basis of successful previous experience which goes back to 1904.

Design of the new Acme-Gridley single, shown in action in Fig. 1, is typical of the effect of tungsten carbide tooling on machine tool engineering. To attain maximum production with carbide tools, range of spindle speeds has been increased (that on machine illustrated ranging from 45 to 800 rpm); horsepower has been stepped up to 25; frame has been stiffened up all around, bringing weight of machine up to 13,200 pounds, and a heavy outboard support has been provided for the longitudinal turret.

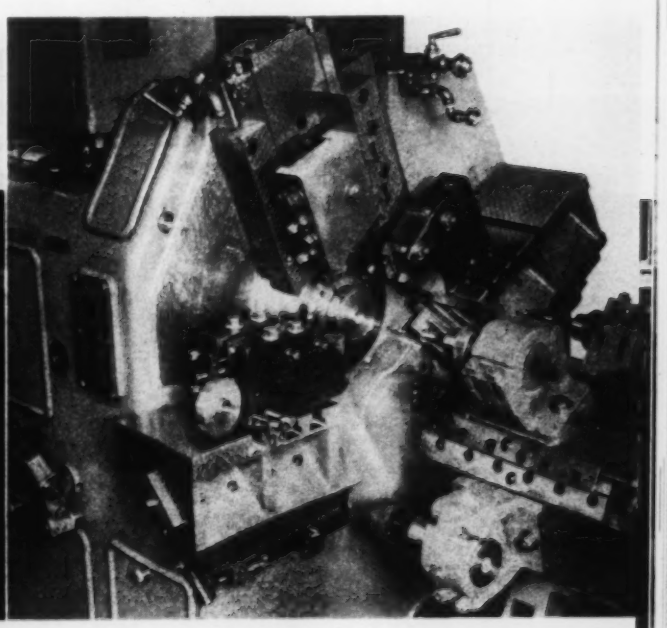
Early model machines of comparable bar capacity had only one-fifth the horsepower and weighed less than half as much, but this new machine is capable of turning out work such as that shown in process in Fig. 3, more than ten times as fast as was possible on those old machines. That sums up in few words typical progress in machine tool design and tooling in 25 years.

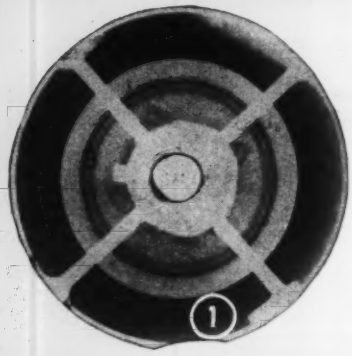
In this article there is space only to touch briefly on a few of many interesting new features—of which the most important in the estimation of the writer is the independently driven turret indexing mechanism shown in detail in Fig. 2. As can be gathered from the overall view of the machine, Fig. 1, this mechanism is housed completely in the outboard turret support. Its only operational connection with the rest of the machine is through a simple electrical circuit.

(*Please turn to Page* 80)

Fig. 1—New single spindle automatic with guards removed to reveal tooling and chip area. Screw chip conveyor can be mounted in archway of outboard support

Fig. 3—Tooling setup for production of 3¾-inch diameter part in 4¾-inch automatic. Upon being cut from the bar, finished piece is retrieved by "pick-off rod" on turret





X-Ray Diffraction Patterns

. . . measured by "photomicrometer"

IN a crystalline material such as metal, the interatomic spacing is altered by the application of an external stress. Since this spacing can be measured by x-ray diffraction techniques, it is possible to determine the magnitude of the lattice strain. In connection with investigations in the field of x-ray strain measurements, John A. Bennett of the National Bureau of Standards has developed a photomicrometer which has several advantages in measuring diffraction patterns. This work represents an extension of a previous development by the bureau's Metallurgy Division of a more sensitive x-ray diffraction technique for the determination of strain in metals.

Primary difficulty encountered in the x-ray measurement of stress or strain in metals is the lack of sensitivity. This is due to the small change in diameter of the diffraction ring with change in stress and the diffuse nature of the ring, which makes precise measurement of its diameter difficult. The principal requirement of an instrument for measuring the diffraction rings is, therefore, a high degree of accuracy. The Knorr-Albers microphotometer used in the pre-

Fig. 1—Typical diffraction pattern used for lattice strain determination. With a calibrating ring (A) of known inside diameter recorded on the x-ray film, radius of diffraction ring (B) can be determined directly by measuring its distance from inside of calibrating ring. Specimen SAE 4130 steel

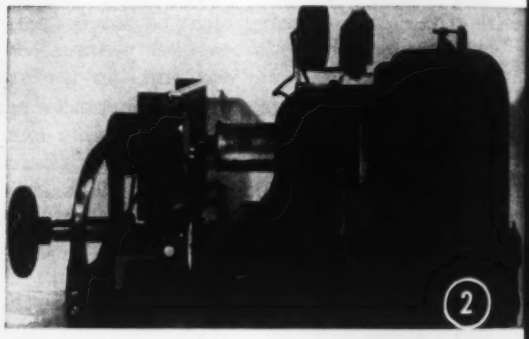


Fig. 2—Apparatus developed at National Bureau of Standards for measuring x-ray diffraction patterns of metal under strain

Fig. 3—Schematic diagram showing operation of the "photomicrometer." Light from source (A) is focussed by condenser lenses onto a curved slit (B). Image of slit, reduced 5 to 1 by the 24 mm microscope objective (C) is focussed on film in holder (D); and light passing through film is measured by photocell (E). Variations in intensity of source are compensated by cell (F) which receives its light through a prism (G) and adjusting screen (H). Movement of film holder is measured by dial indicator (K).

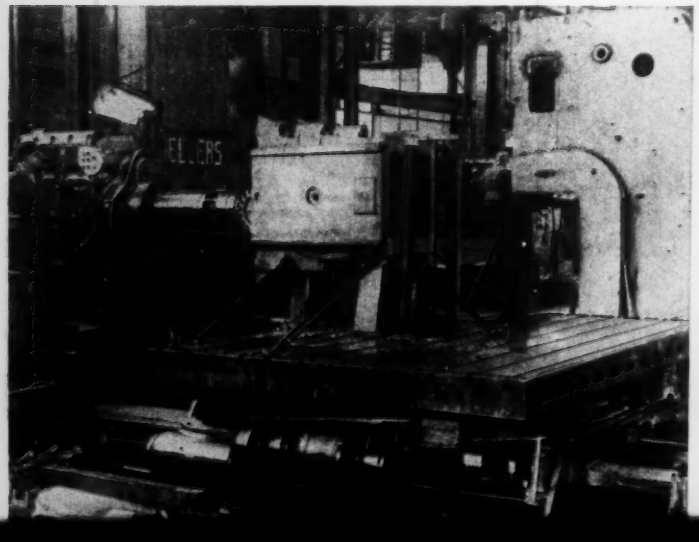
Fig. 4—Plot of galvanometer deflections obtained as diffraction lines in a pattern similar to Fig. 1 were scanned

Turntable Setups

. . . facilitate machining operations, minimize handling

By ERLE ROSS
Chicago Engineering Editor, STEEL

Photos by Dan Reebel



IN fabricating its line of drawing presses, forging presses, punch presses and press brakes, Verson Allsteel Press Co., Chicago, is obliged to perform a wide variety of machining operations. To facilitate these operations and to minimize handling, the company has devised several interesting machine tool setups.

Fig. 1 shows the arrangement by which complete machining, including all milling, boring and tapping operations, is accomplished on press frames and components in one setup. The motorized turntable used in conjunction with the Sellers horizontal floor-type boring mill was designed and built by the company to serve its particular needs. It is 10 x 14 feet, provides complete 360-degree indexing, has 8-foot travel and will carry work weighing as much as 100 tons.

Component the illustration shows being machined is the blank-holder slide of a 250-ton double-action press. Once the job has been set up on the turntable, complete machining is performed by changing tools and by rotating the table. This includes milling outer gibs and inside gibways for punchholder slide, boring

Fig. 1—Arrangement for milling, boring, drilling and tapping press frames and components in one setup

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viously reported work was excellent in this regard. However, it has two disadvantages: First, its chart record is jagged, making it difficult to locate the maximum; and second, the time required to obtain measurements is excessive.

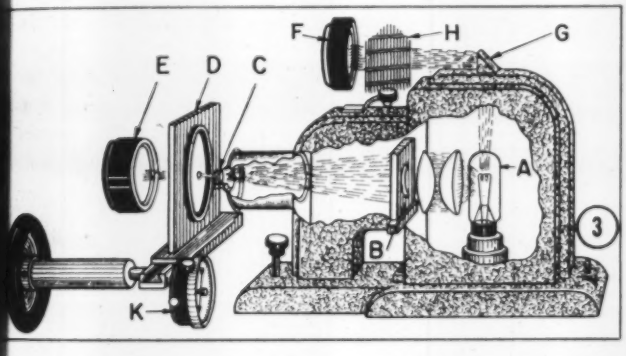
Patterns Measured Directly—To eliminate these disadvantages without decreasing the accuracy obtained on the microphotometer, the new instrument was designed for measuring the patterns directly. The calibrating ring of known inside diameter is recorded on the film immediately after the diffraction ring, and radius of diffraction ring is determined by measuring its distance from the inside of the calibrating ring.

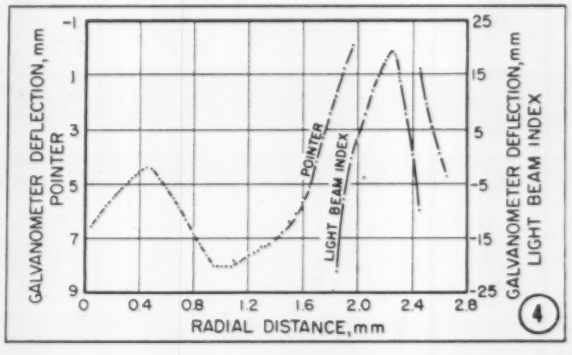
The apparatus is essentially a densitometer with a dial indicator to measure movement of the film. A novel feature is a curved slit in the optical system so arranged that the light beam which scans the diffraction ring is an arc having the same radius of curvature as the ring. In this way the entire ring over an arc length of 15 degrees is automatically integrated to determine the point of maximum density.

After passing through the film, the light is received on a barrier-layer-type photocell. This is connected in a compensating circuit with a galvanometer and a second cell illuminated by direct light from the source. Thus, fluctuation in the galvanometer reading due to changes in intensity of the source are eliminated. A fairly sharp maximum in the galvanometer reading is observed when the diffraction ring on a typical pattern is scanned, so that the results can be reproduced within 0.01 to 0.02 mm.

Reading Recorded—In operation the film carriage is moved until the maximum density of the diffraction ring is located, and the reading of the dial indicator recorded. The carriage is then shifted until the light beam is positioned on the inside edge of the calibrating ring; the indicator reading is again noted. The difference between these readings and the known radius of the calibrating ring gives the radius of the diffraction ring.

A comparison of measurements from the bureau's instrument with those obtained from conventional microphotometer records showed both results to be nearly identical in actual magnitude of the average pattern radius as well as in precision (as indicated by the scatter of individual readings). Use of the new instrument over a several month period has saved about 25 per cent of the total time.





all adjusting screw holes and milling liftout pads.

Another interesting feature of this machine tool installation is that it comprises two Sellers boring mills operating as twins on a common screw. The second unit is partially shown in the right background of Fig. 1. Each mill has an 8-inch spindle, 72-inch horizontal travel and 10-foot vertical travel. Through use of the common screw, it is possible to make 60-foot cuts, 44 feet with the left-hand mill and 16 feet with the right-hand. Since a single bed serves both machines, the turntable can be picked up by overhead crane and moved to any desired position for use with either mill, or removed altogether.

Fig. 2 shows another example of how Verson uses a specially-built turntable to accommodate machining of steel press frames and components in one comprehensive setting. In this case, the 8 x 10-foot, 360-degree indexing, motorized turntable has been applied to a Giddings & Lewis 6-inch spindle horizontal boring, drilling and milling machine.

Work shown on the turntable, the frame of a 250-ton press, is typical of jobs handled with this setup. Before the frame is removed for delivery to the assembly floor, the following operations will have been performed: Bed will be milled; front, back and gibways milled; cushion guide gibways inside bed milled; bottom of bed milled for cushion mounting; holes drilled for cushion mounting studs; rear of press milled for outboard flywheel support; and top milled for counterbalance mountings.

Fig. 2—Eight by ten foot, 360-degree indexing motorized turntable applied to 6-inch spindle horizontal boring, drilling and milling machine

DEEPER DRAWS AT LESS COST

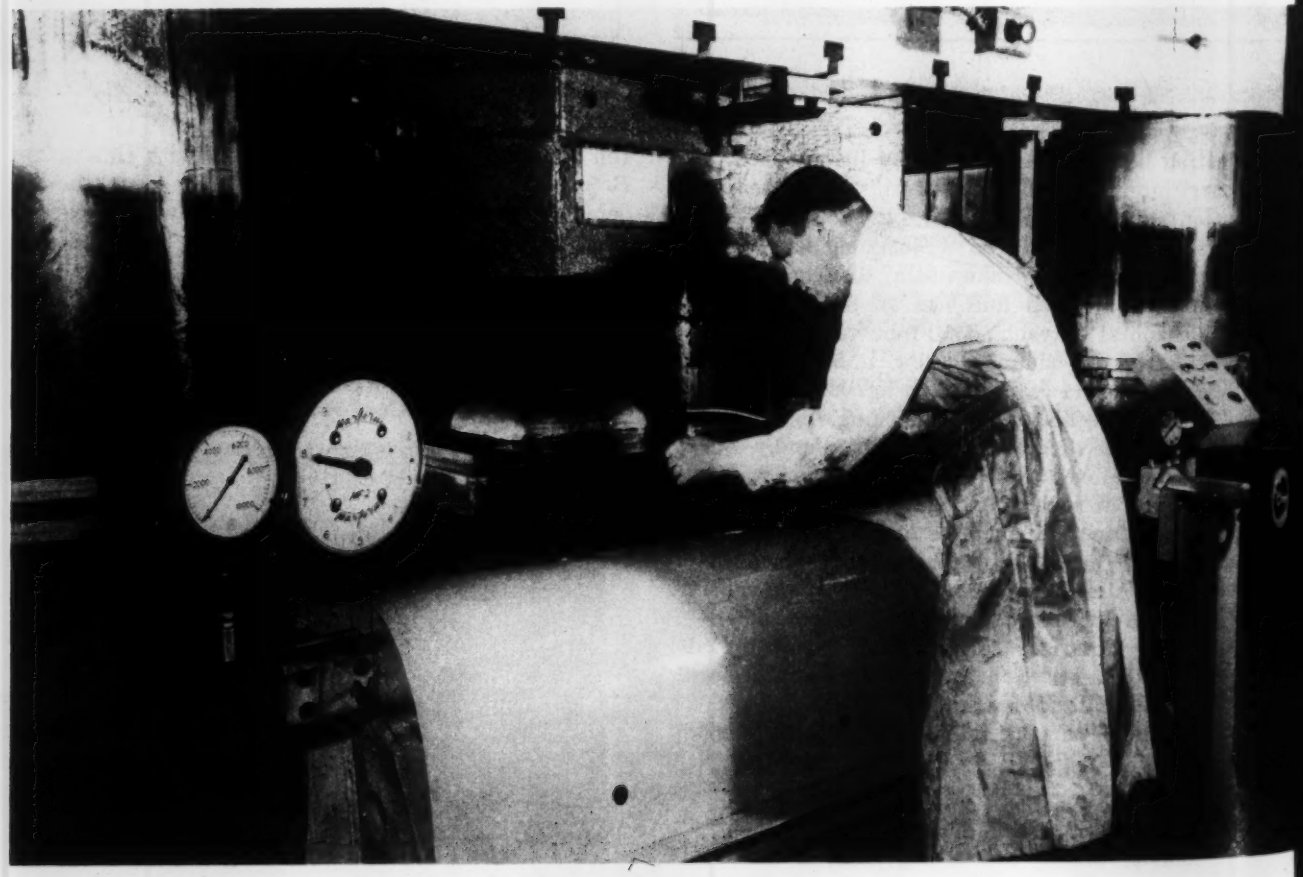
Reduced tooling costs in low and high volume production, greater tapers without wrinkles, elimination of hand finish-forming are some advantages cited for Glenn L. Martin Co.'s Marform process. Success of method is result of precision control of pressure curve for part's forming cycle

PRODUCTION savings as high as 50 per cent are being made by Glenn L. Martin Co., Baltimore, using a new metal forming process. The method, developed by Martin, results in a substantial increase in the rate of production of numerous types of detailed parts and a considerable decrease in labor and tooling costs. The company has found it possible to form certain stainless steel exhaust stacks, for example, with greatly diminished tooling expenditures and at an increased manufacturing rate.

Equipment for the so-called Marform process, STEEL, Sept. 26, 1949, p. 100, now slated for manufacture as a package by Hydropress Inc., New York, was designed to combine the forming ability of a steel die with the economical tooling of the Guerin process, in which rubber is used as a substitute for the normal female portion of the tool. This objective was attained to a high degree although certain minor compromises were necessary.

Tool Cost Cut—For example, the process utilizes the same simple male punch employed in the Guerin process but it also requires rests. It is therefore unnecessary to make either a female die, pressure plate or draw ring. This means that it is unnecessary to make half of the tool formerly required for a drawn part but this fact saves more than half the cost of the tool in many cases for several reasons. The first reason is that the female portion of the tool is often the most difficult to make since it is more difficult to work down in a hole. The second and most important reason is that the matching prob-

Fig. 1—Closeup as operator places a blank on the tool of a Marform metal forming unit



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lem between the two halves of the tool has been eliminated. This matching work is of course very tedious and costly.

The Marform punch can be made of Masonite for short runs of soft materials. Cast Kirksite can be employed for longer runs or harder materials. However, steel punches are generally employed for production runs, especially on harder materials. The flat plate on which the metal rests is always made basically of steel. This plate must be flat and smooth but the fit between it and the punch is unimportant except when forming very thin metal such as ten or twenty thousandths thick stock. However, a thin Masonite overlay is often employed on the steel plate on short runs to save the cost of grinding the surface of the steel plate. The inside periphery of the plate, where it surrounds the punch, and the outside periphery of the plate can be torch cut in most instances.

Added Formability—A reduction in area of 57 per cent is considered normal in Marform work on aluminum alloys and figures as high as 70 per cent have been attained in testing operations. A cup depth equal to 1½ times the radius is normally expected in Marform on the same material and depths equal to 1.2 times the diameter, or 2.4 times the radius, have been attained in certain cases. The process can sometimes form a part in one operation that would otherwise require two operations.

There are several apparent reasons for this added formability. One of the most obvious reasons is the fact that the rubber has a certain cushioning effect and therefore prevents rapid application of strain at any point on the metal.

Prevents Concentration of Strain—The rubber also exerts a lateral pressure during the forming operation which is a direct result of the applied forming pressure. This lateral pressure has the effect of locking the metal already formed to the male portion of the tool. This prevents an accumulation of strain at the punch radius, and causes the strain to be distributed uniformly over the complete surface of the piece to be formed.

Prevention of concentration of strain at the punch radius not only enables the part to be formed deeper but also causes the part to be more satisfactory in certain applications where uniform thickness is important.

There is another related advantage in the fact that the rubber locks the material against the punch. This arises from the phenomenon that very local elongations in metal can safely be higher than elongations over a relatively longer gage length. The rubber automatically causes the metal to be strained over a much shorter gage length by locking it just above the instantaneous point of forming and therefore provides the elongation available from the shorter gage lengths.

Third factor which enables the Marform process to form a deeper part in one operation is the ability of the machine to provide an exact required pressure on the material at each desired depth of stroke. This pressure can be varied in either direction. In other

Fig. 2—Forming a part on the machine used on a 3500-ton press. Operator places blank on the tool and presses the control button. Forming and ejection of the part are automatic

Fig. 3—Operator is shown making adjustment of pressure control

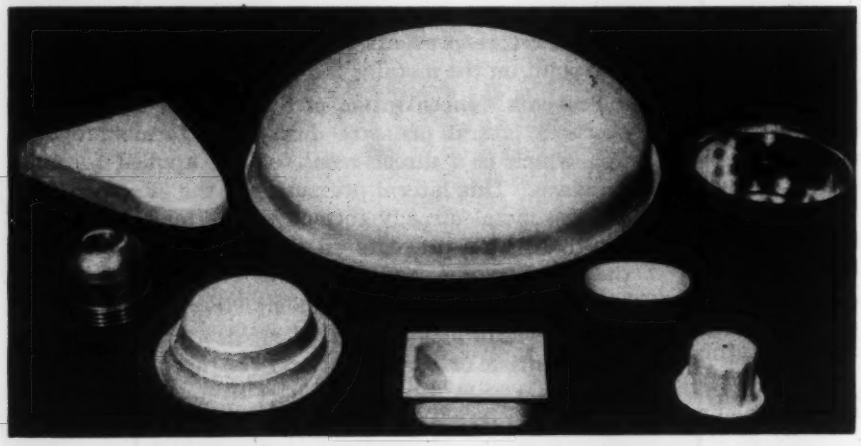

Fig. 4—Assortment of metal parts formed by the process. Parts range from 0.010-inch aluminum to 0.109-inch deep drawing steel and represent a large variety of shapes and sizes

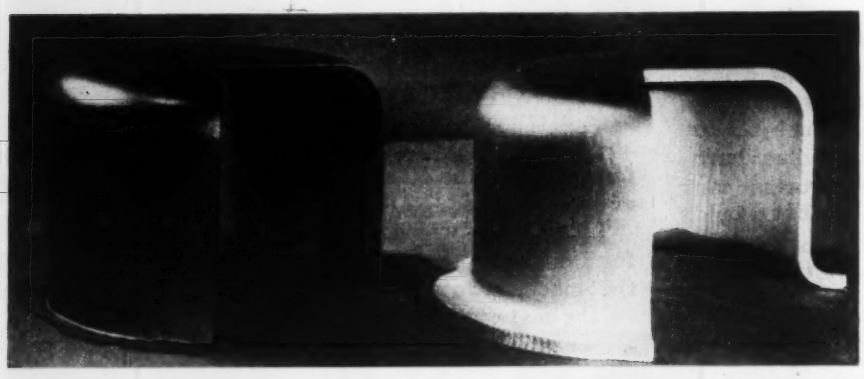

Fig. 5—These parts were formed on the same tool with a single stroke. One is 0.030-inch SAE 1010 steel, the other ¼-inch thick 61sO aluminum

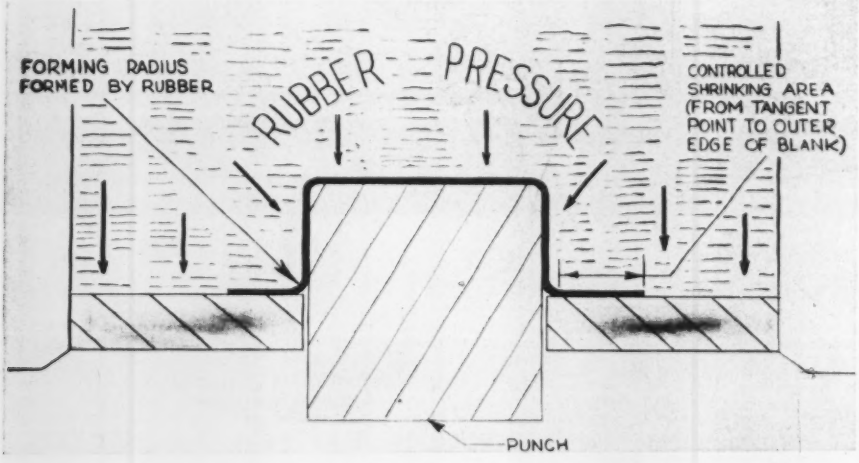
FORMING RADIUS FORMED BY RUBBER
RUBBER PRESSURE
CONTROLLED SHRINKING AREA (FROM TANGENT POINT TO OUTER EDGE OF BLANK)
PUNCH

Fig. 6—Sketch illustrating punch and plate on which unformed metal rests. Rubber pressure is exerted in all directions against the part

words, it can start low, be increased, and then drop off, or, it can gradually be increased from start to finish, or it can be started at a high value and then dropped gradually to a lower value. The pressure variation can be infinite within the minimum and maximum values, and therefore it is not a series of steps.

Precision—Sheet metal parts can be made to a tolerance of plus or minus 0.002-inch. A tolerance of plus or minus 0.005-inch is commonly obtained on parts where the shape is sufficiently rigid to maintain such accuracy.

Material as thin as 0.010-inch thick has been successfully formed and a 0.012-gage cup was deep-drawn to the point where the depth of the cup was 0.9 of the diameter of the cup. Gages as thick as 0.675 in aluminum alloys and 0.102 in SAE 1010 steel have been formed. This is not necessarily the maximum but only represents the thickest gages formed to date.

Problem of applying finishes to formed shapes is sometimes critical from the economy standpoint. This is particularly true of polished surfaces. It is more economical to polish material in the flat state and then form the parts. This results in marred finishes when the normal processes are used. However, round cuts have been formed on the Marform machine successfully where the material had been previously coated with such finishes as vinyl, aircraft paints, and crackle paints. This experiment was also performed with polished material.

Tapered Shapes — Tapered shapes are a major forming problem. Since any tapered shape tends to wrinkle, due to the distance between the punch and the pressure plates of the die at the start of the forming stroke, tapered shapes are important to industry because they are attractive, because they will stack better, and because they save metal. The new process has the definite advantage on tapered shapes.

It is difficult to quote a rule on what can be accomplished with the limited experience to date, but the following examples will serve as a guide as to the severity of taper which can be formed without wrinkles. Consider a 4-inch diameter on the top of the punch and with a taper outward toward the bottom of the punch. On such a punch the gap could be ½-inch between the punch and supporting pressure plate, for 0.025-inch thick steel. This gap can be increased to ¾-inch with the thickness of the steel increased to 0.050-inch. The gap can be 3/16-inch with 0.025 aluminum and ⅜-inch with 0.050 aluminum. Developments are under way at the present time which cause us to hope for a radical improvement in the permissible taper in one operation.

Equipment — Current Marform equipment varies from one minute to another as dictated by the development progression and by the basic press equipment available. The presses employed currently at the Martin Co. are of 800 and 3500 tons capacity. The 800-ton press is used in conjunction with a unit which has a 16 x 18-inch forming area, providing a forming pressure of 5560 psi.

The 3500-ton press is used with a

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MESTA Forgings

Mesta Forge Shops are equipped to produce, from raw material to finished product, carbon and alloy steel forgings in all sizes required by industry, including crankshafts, marine parts, rotor shafts, rolls, pinions, pressure vessels, pump blocks, table rollers, coupling halves, spindles, gears, and many others.

The illustration shows a one-piece forged steel high pressure accumulator bottle for a 6,000-ton hydraulic forging press. It was produced complete in the Mesta Plant.

Write for descriptive forging literature.

DESIGNERS AND BUILDERS OF
COMPLETE STEEL PLANTS

MESTA MACHINE CO.

PITTSBURGH, PENNSYLVANIA

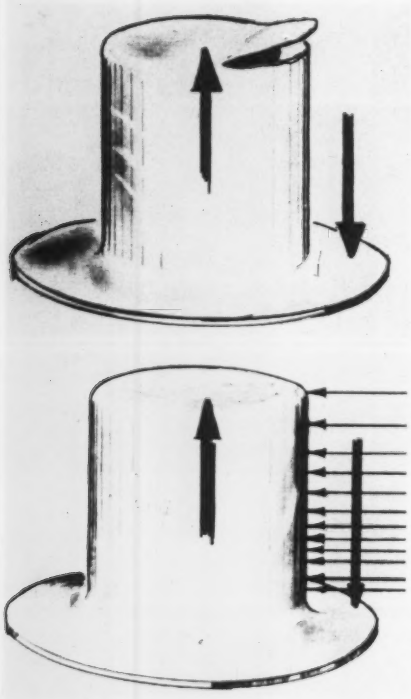

Fig. 7—Illustration at the top shows forces on a piece of material when a deep-drawn cup is formed on a steel draw die. Large arrow pointing upward in center of cup illustrates the force applied by the punch. Large arrow pointing downward on the flange of the cup illustrates force applied by the pressure pads. Fracture shown is a typical failure. Illustration at bottom shows forces acting on the same cup when same part is formed on a Marform machine. Horizontal arrows in this view indicate lateral pressure of the rubber which locks material against punch

28 x 31-inch forming area which offers a theoretical forming pressure of 8060 psi. However utilization of this maximum pressure increases the maintenance cost on the equipment so that this press is not used to provide more than 7000 psi. These pressures can be directly translated into working pressure on the metal in the Marform unit itself.

Speed of operation of the smaller press enables the company to obtain 120 cycles per hour, which may result in a multiple of that number in pieces per hour since more than one piece is often formed at one time. The large press operates at a speed of 60 cycles per hour, and this rate can also be multiplied by the addition of more parts in the same stroke. Speed of operation is based entirely upon the speed of the hydraulic press equipment on hand and can be increased to match the speed of any faster hydraulic press. No attempt has been made as yet to apply a machine to a mechanical press.

Many things are planned for further investigation in the future. These are wider application of the process; development of allied tooling for secondary operations, which has already shown considerable promise; further investigation of the fact that the machine can automatically and simultaneously shear material at any direction to the forming stroke; simplification of the equipment; and more extensive use of conservation of energy principles.

Holds Work at Any Angle

WORK may be held at any desired angle in angular drilling, milling, planing, shaping and grinding operation with the Boston universal angle plate for tool and jobbing work. Also said to be valuable in production where special jigs and fixtures may be too expensive, the tool is built by U. S. Automatic Box Machinery Co. Inc. of Boston.

With it work is quickly set up on the table; location of the work at the desired angle is also said to be rapid. Tool is offered in several stock sizes and is graduated to 360 degrees horizontally and 120 degrees vertically, with verniers applied to each graduation. The angle plate is said to be adjustable to within 5 minutes of any desired angle. Alignment of the unit is facilitated by means of keys on the base.

Moly as a Lubricant

AN EXTREMELY "greasy" metal, practically indestructible at high temperatures and pressures and having the faculty of plating itself to any friction surface is molybdenum. It is said to form a permanent friction-supporting film which cannot be squeezed out by any amount of pressure, thus protecting a bearing against scoring or seizing. These facts have been determined by research conducted in government aeronautical laboratories and large industrial concerns on the lubrication of high-speed, high-temperature and high-pressure bearings.

Molybdenum lubrication is available in a form suitable for use in any conventional lubricating system as Liqui-Moly, from Lubricants Division of Lockrey Co., College Point, N. Y. It may be used alone or added directly to crank-case or other oils which carry it to the friction-surfaces.

The tests are said to have shown that friction surfaces running at high speed and under heavy pressure will heat up one-third to one-fifth slower with the new lubricant as contrasted with ordinary lubricants. Material is said to display good chemical stability and is unchanged in its properties by extremes of temperature, operating efficiently either at subzero or red-heat.

Other applications besides automotive and other bearing and gear applications are for lubrication of deep-drawing dies, where it reportedly will eliminate handworking of high-spots and prevent metal pull-out. Other attributes of molybdenum as a lubricant include elimination of run-in time on precision-fit bearings and slides, as a pipe-fitting compound where it brings about quick disassembly regardless of age, heat or corrosion and the use to prevent the sticking of tight-wound flat coil springs.

High-Temperature Steel Data

FINDINGS and data on high-temperature steels have been pooled into an 87-page illustrated booklet, "Steels for Elevated Temperature Service," written by research scientists of the United States Steel Corp. It is available through Carnegie-Illinois Steel Corp., Pittsburgh, for use of engineers, chemists and metallurgists in the power, transportation and chemical process industries, as well as those who are interested in design of jet engines, rockets and gas turbines.

Booklet opens with a discussion of general principles of elevated temperature behavior of ferrous metals and the factors that influence this behavior.

Detailed information on the measurement of flow under stress and full description of special testing equipment and methods used in the research laboratories of the company follow a section on the nature of "creep." Composition, microstructure, grain size and internal stability are given treatment, with attention to structural stability, aging, temper brittleness and the embrittlement of ferritic chromium and austenitic chromium-nickel steels.

Both tabular and graphic data on the specific mechanical properties of 21 different steels are also provided.

Covered are a wide variety of chemical compositions of broad, general interest to those concerned with specific problems. Essential data for the 21 compositions are also summarized in the form of a bar diagram which provides an over-all qualitative comparison of the principal properties.

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TURBO-HEARTH PROCESS

Promises Quality Steel in 12 Minutes

Fifteen commercial scale heats verify experimental results involving side-blown vessel suspended on trunnions similar to bessemer converter. Basic brick capable of withstanding temperatures over 3000° F employed to line hearth chamber

By C. E. SIMS
Assistant Director
Battelle Memorial Institute
Columbus, O.
and
F. L. TOY
Assistant to Manager, Research & Development
Carnegie-Illinois Steel Corp.
Pittsburgh

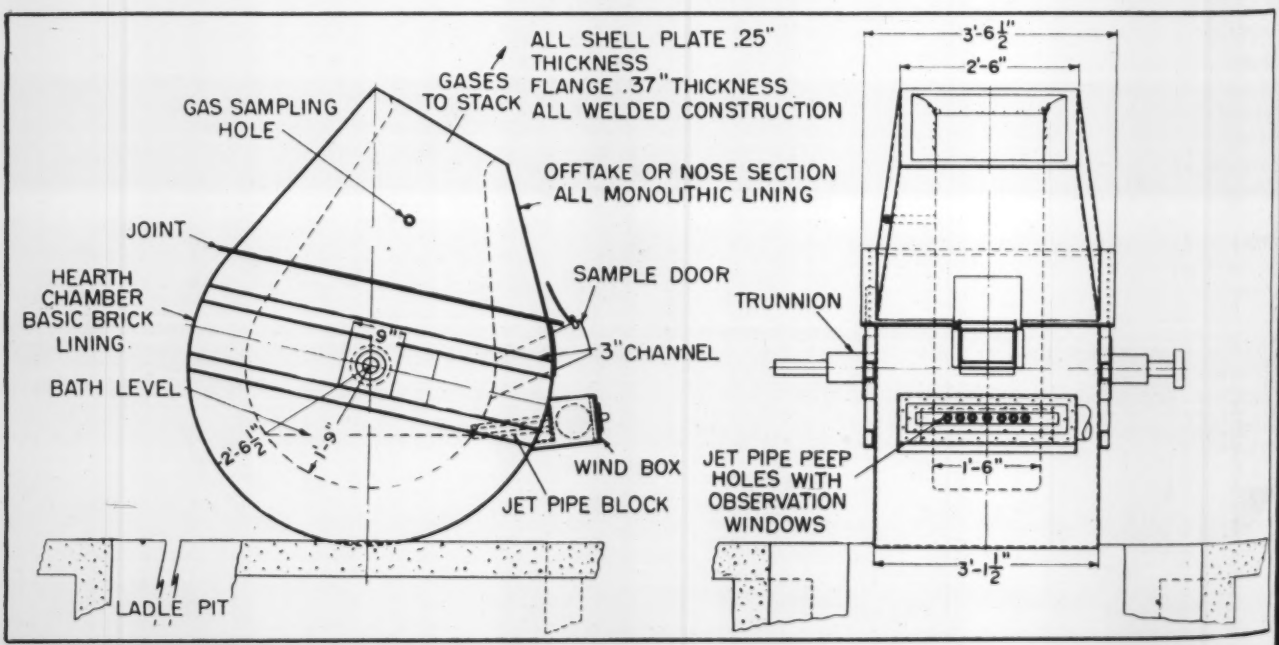
THIRTY-TWO HEATS of new special process steel have been made by surface-blowing 1000-pound charges of hot basic iron in a basic-lined hearth. Experiments were conducted in a co-operative research project of Carnegie-Illinois Steel Corp. and Battelle Memorial Institute.

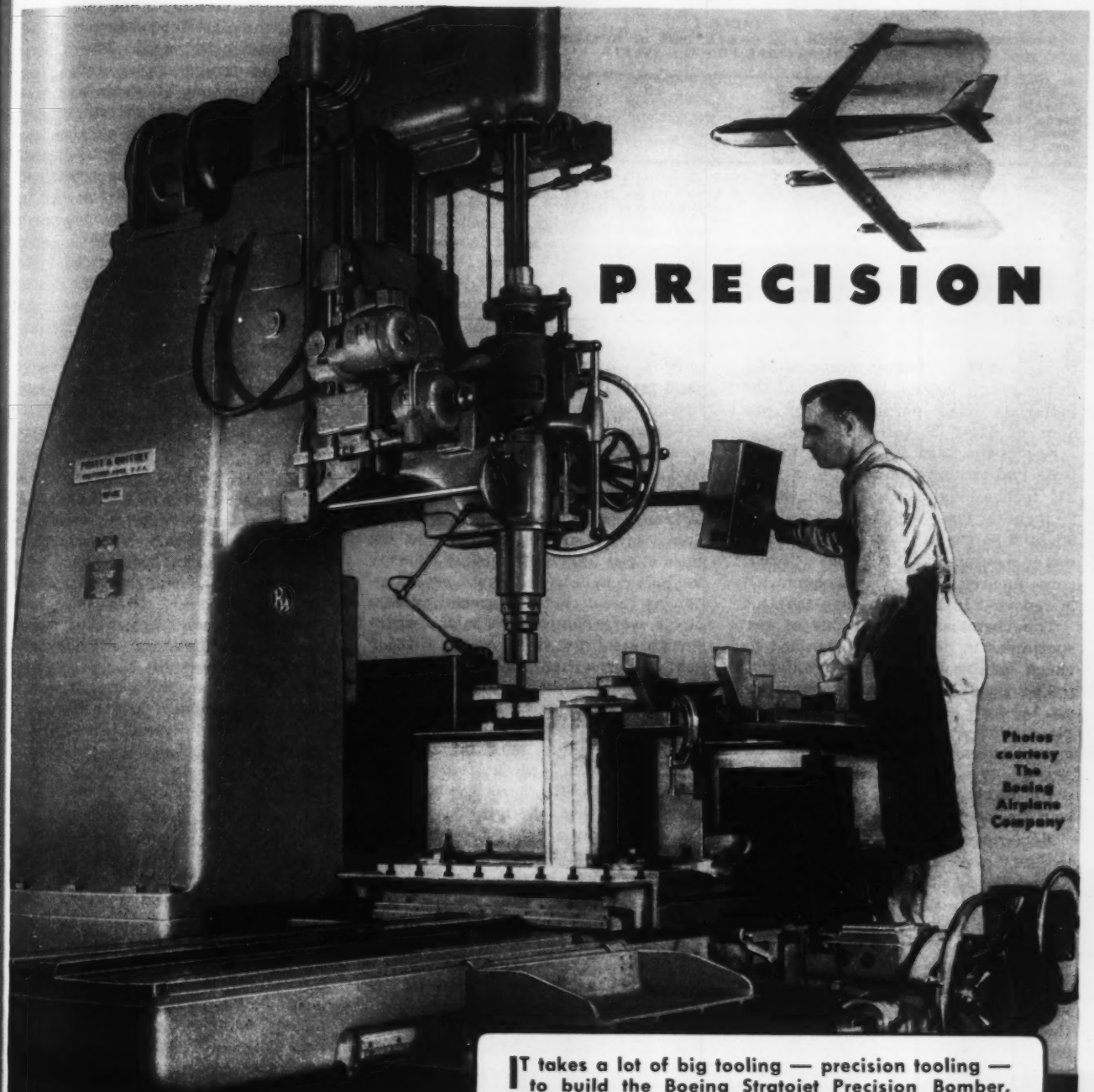
The new steelmaking unit (see STEEL, Apr. 25, 1949, p. 98) is said to be capable of making open-hearth quality steel in 12 minutes without using external fuel. Conclusions from the research projects are as follows:

1. Surface blowing in a basic-lined hearth to produce steel from basic iron is chemically sound, metallurgically feasible.
2. Mechanical properties of steels produced place them in same limits as open-hearth steel of the same composition.
3. Standard basic pig iron is entirely suitable as raw material.
4. Average time of heat was 12 minutes. The time was demonstrated to be a function of the rate of air input, or of oxygen input when oxygen-enriched air was used.
5. Abrupt carbon flame drop was an accurate indication that the carbon content was about 0.05 per cent.
6. Carbon can be oxidized to below 0.03, manganese below 0.01, and silicon below 0.01 per cent.
7. Nitrogen can be maintained at about 0.003 per cent.
8. Up to 97 per cent of the phosphorus and up to 50 per cent of the sulphur can be eliminated.
9. A substantial part of the temperature gain in the process was found to be from the oxidation of about half carbon to CO_2.
10. Burned lime requirements were from 120 to 180 pounds per ton.
11. The fumes produced were definitely less dense than in the acid bessemer process. In the course of the experiments slopping was controlled until it was no further problem.

Finishing Temperature Controlled—During the experimental program some of the heats were raised in carbon, manganese and silicon by the addition of carbon and of ferroalloys and deoxidized by aluminum to produce ingots of semikilled plate and structural grade. The ½-inch test pieces which were processed from two of these ingots are designated in the following text as special process No. 1 and No. 2. The mechanical properties of these test pieces were compared with those of specimens from plates processed from a representative bessemer blow and a representative open-hearth heat. In selecting the material, the composition, particularly with respect to carbon and manganese, was specified to permit a comparison at approximately the same strength level after normalizing. Because the steels from the three processes were reduced to ½-inch thick plates by methods which were not identical, it was not feasible

Experimental hearth chamber for surface blowing hot metal





PRECISION

Photos courtesy The Boeing Airplane Company

IT takes a lot of big tooling — precision tooling — to build the Boeing Stratojet Precision Bomber, and the PRATT & WHITNEY 4E JIG BORER helps to provide it. With this big *new machine*, Boeing locates, bores and checks heavy work for the B-47s to .0002" accuracy . . . attains maximum productivity and economy from the 4E's new features which include push button control for all motions . . . electronically controlled milling feeds infinitely variable from 1" to 15" per minute . . . electrolimit spacing. These, and other advanced design features, provide operating speed and accuracy in this 15 ton machine equal to that obtained with smaller, lighter equipment. Table size is 36" x 72" (machine can be furnished with several column heights and with several types of rotary tables). Newly published Bulletin tells more about this most modern of Jig Borers; write for your copy.

PRATT & WHITNEY

Division Niles-Bement-Pond Company
WEST HARTFORD 1, CONNECTICUT

4E JIG BORER

TABLE I
COMPOSITION OF PLATE USED FOR COMPARISON OF BESSEMER, OPEN-HEARTH, AND SPECIAL PROCESS STEELS

Type	Composition, % C	Mn	P	S	Si	Al	Al_2O_3	N
Bessemer	0.15	0.45	0.087	0.038	0.017	0.006	0.005	0.008
Special process No. 1	0.18	0.68	0.027	0.019	0.102	0.005	0.020	0.002
Special process No. 2	0.26	0.52	0.022	0.024	0.086	0.007	0.013	0.003
Open hearth	0.26	0.47	0.014	0.034	0.075	0.006	0.009	0.003

TABLE II
LONGITUDINAL TENSILE RESULTS ON MATERIALS NORMALIZED AT 1700° F FOR ONE HOUR

Tensile Properties	Bessemer	Special Process No. 1	Special Process No. 2	Open Hearth
Upper yield, psi	41,850	35,450	36,550	36,300
Tensile strength, psi	61,050	60,450	66,850	64,550
Elongation in 2 in., per cent	37.5	35.7	35.2	37.5
Reduction in area, per cent	64.7	56.8	57.7	61.6

to control the finishing temperatures, in the range desired. Hence, all of the materials were normalized for one hour at 1700° F before testing.

Specimens used for making tensile tests had reduced sections, ½ x ½ x 2¼ inches long, and gage lengths of 2 inches. This specimen size was adopted so that the existing extensometer equipment could be utilized; consequently, the per cent elongation is reported in a 2-inch-gage length.

The chemical compositions of test specimens in per cent as obtained by check analyses appear in Table I.

The usual bend tests were made on 1½-inch wide specimens of full plate thickness. All of these specimens not only bent the required 180 degrees over a diameter equal to the plate thickness, but could also be bent flat without rupture.

Performance of Steel—In addition to the usual tensile testing report, Table II, additional test specimens of each of the four steels were tensile strained 10 per cent after which aging treatments of 10 minutes at room temperature, 24 hours at room temperature, and 3 hours at 400° F were applied. The specimens were then put back in the tensile machine and tested to failure. By comparing the results of this testing with those obtained in the customary tensile test, it was possible to evaluate the effect of the above aging treatments, after 10 per cent straining, on the increase in true stress at 10 per cent strain, and the increase in tensile strength and the loss in uniform elongation, total elongation and reduction in area. The data obtained showed that the two special process heats performed similarly to the open-hearth heat and both steels performed differently from the bessemer steel. The same differences were brought out by hardness tests conducted before and after both straining and strain aging.

Another more commonly used test for determining strain aging was tried on the steels tested. This is the familiar concrete-bar test in which test specimens are bent 90 degrees, aged at 550 degrees for 1 hour and unbent. In this test, the bessemer steel fractured with practically no deformation on unbending, whereas specimens of the two special process steels and the open-hearth steel unbent to a flat position without developing cracks.

Transition temperatures were determined on all of the materials in the normalized condition using Charpy keyhole notch bar impact specimens. It was found that the special process steels were comparable to the open-hearth steel and had lower transition temperatures than the bessemer steel.

Charpy notch-bar impact tests were also conducted on these materials in both the strained and strain-aged conditions. Results indicated that the effect of both straining and strain aging are greatest in the bessemer steel, and that the special process steels are much more like the open-hearth steel in this respect.

One method sometimes used to evaluate strain aging is to compare the tensile strength at room temperature with that at approximately 400° F. Materials showing a gain in tensile strengths at 400° F are said to be susceptible to strain aging, and the degree of strain aging is judged by this increase. The strain-aging propensity of the two special process steels in this test is comparable with that of the open-hearth steel.

Results of Tests—Fifteen commercial scale heats made later at South Works by the special process, cast as ingots and rolled into plates were subjected to a number of the above tests (ordinary and extraordinary) to determine whether the properties differed from those of open-hearth steels. It should be realized that the compositions were such as to give "as-rolled" tensile strength ranging from 45,000 to 49,000 psi, so that a direct comparison with the properties of the Battelle heats could not be made. However, the customary tests indicated that the tensile and bending properties of the South Works special process steels were equivalent to normal open-hearth steel properties for a similar composition. In addition, the reverse bend tests indicated clearly that the material performed as well as open-hearth steel. The Charpy transition temperatures were favorable and amount of strain aging exhibited in the Charpy tests was approximately the same as that previously exhibited by the Battelle heats. It, therefore, was concluded that this special process material behaves in a like manner to open-hearth steel of similar composition.

The experimental unit of 1000-pound hearth capacity was decided upon because it was considered that this was about the smallest quantity of iron that could be blown to advantage and the largest that could be melted conveniently in the laboratory.

In designing the unit, efforts were made to keep it as simple yet as flexible as possible to obtain maximum experimental data. The main dimensions and principal details of construction of the shell are shown in the accompanying drawing. The shell was made in two parts, the nose or offtake section being separate. The lower section, or hearth chamber section, is a short cylinder with axis horizontal and a segment cut off at the top where the nose section is attached. The nose section is a truncated pyramid designed to carry away the gaseous products of reaction.

This design provided a fairly shallow bath, with a maximum depth of 9 inches, and a large surface area, approximately 18 x 36 inches. The blast traveled the long dimension of the bath surface to give the maximum opportunity for reaction. Thus it came close to simulating conditions that would pertain to larger hearths. By making the hearth chamber proportionately twice as wide, the capacity could be increased to more than 27 tons by increasing the diameter three times.

The lower section or hearth chamber, with the exception of the jet-block area, was lined with hard-burned magnesite brick laid in magnesite mortar. The nose section was made with rows of welded studs inside. An internal, removable form was inserted, and a periclase ramming mix tamped into place to form a monolithic lining. The two parts of the shell were lined separately and then assembled.

The seven jet pipes were placed in a single row and threaded into a base plate like a row of candle molds. The back plate of the wind-box was provided with a row of Pyrex windows arranged so that the operator could sight down each pipe.

The complete unit was mounted over a pit large enough to allow the unit to turn over completely. This pit

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also contained a slag box and a ladle for receiving the finished metal.

The most satisfactory method tried for sampling the bath during a heat was to make an opening through the shell above the wind-box big enough, and at such an angle, that a regular sampling spoon could be dipped in and withdrawn with a sample of metal. Satisfactory slag samples were not obtained when the blast was on. Samples of charge metal were taken before it was put into the hearth, and samples of finished metal and slag were obtained when the hearth was tilted for pouring. Almost every sample of metal and slag was analyzed by two laboratories, and in most cases excellent checks were obtained. Gas samples were taken through a hole in the sidewall of the nose section.

Temperatures Checked During Pouring—Temperatures were determined with a Pyro optical pyrometer. Readings on the pig iron were taken as it poured over the spout of the induction furnace used for melting or over the lip of the ladle into the hearth chamber. Temperatures of finished metal were taken as it poured over the lip of the nose section into the ladle. Temperatures during the heat were taken by sighting through a window and down one pipe.

It is appropriate to compare the surface blowing operation with the bottom-blown basic or Thomas process. While the elimination of silicon, manganese and carbon is similar in the two processes, the course of phosphorus elimination is significantly different. In basic bottom-blowing converter practice, no important quantity of phosphorus is removed up to the flame drop; the afterblow is necessary to remove this element. In the new surface-blowing process, however, all the phosphorus that is going to be eliminated is out by the time the flame drops.

Although the strongly oxidizing conditions that exist during the surface blowing operation would not ordinarily be considered ideal for sulphur removal, it has come to be well known that a slag, if sufficiently basic, will remove sulphur from steel even under oxidizing conditions. In the present tests, the sulphur of the pig iron averaged 0.035 per cent and that of the finished metal of all the heats averaged 0.021 per cent, with a maximum of 0.028 and a minimum of 0.011 per cent. Most of the sulphur eliminated was removed in the first 4 minutes of the heat, but there was a gradual reduction up to the end of the heats.

Compared with bessemer and tropenas processes, the fumes given off during the blowing period of the new process were relatively small in volume. None were visible in the atmosphere of the laboratory building where the tests were conducted, the air remaining clear at all times. Observations of the stack showed that some brown fumes were emitted for 2 to 3 minutes at the start of blowing (probably manganese oxide), but only a thin white fume was produced for the remainder of the heat.

Commercial-scale experiments were conducted at the South Works plant of Carnegie-Illinois Steel Corp. This work was done in a hearth designed and built by Jones & Laughlin Steel Corp. where it had been tested with an acid lining. Basic lining was installed at South Works and 15 experimental heats were made with charges of 25 and 30 tons of hot-metal using fixed jets to surface-blow the metal.

Many operating problems remain to be worked out before smooth practice can be established, but these commercial-scale tests completely corroborated the results of the laboratory tests as far as the chemical reactions of the surface-blowing process is concerned.

Condensation of paper presented at annual meeting of American Institute of Mining and Metallurgical Engineers, New York, Feb. 12-16.

Quality Control References

GREAT interest in quality control as a means of reducing costs in industry has led the business information bureau of Cleveland Public Library, Cleveland, to devote the current edition of its bulletin, "Business Information Sources", to that subject. Recent references on what quality control is and how it is emphasized today, statistical methods of quality control, administration of a statistical quality control program and reading lists on the subject are included. The bulletin is available from the library, 324 Superior Ave., Cleveland 14, O.

Aids in Motor Selection

REASONS for the existence of different types of fractional horsepower motors and factors to be considered in selecting the right motor for the application are included in the subject matter of a four-page small motor selector offered by Westinghouse Electric Corp., Pittsburgh.

The center pages form a large chart which presents in tabular form the various types of small motors, together with data concerning horsepower range, speed characteristics, torque, reversibility, bearings, mountings and application. Typical speed-torque curves are included.

LAND-GOING "FLAT TOP": Bearing an "above the waterline" resemblance to Uncle Sam's aircraft carriers with all controlling functions along one side of its flat deck is the Traveloader, built by Lull Mfg. Co., Minneapolis. In operation it shoots out a pair of hydraulic jacks from midsection for stabilizing loads up to 30,000 pounds. The hydraulic elevator slides out sideways and picks up the load from beside the truck. As the forks move under the load, the tower may be tilted inward to safely cradle the cargo before sliding upward and inward to deposit it upon the deck. The mission is completed with jacks being retracted in as little time as 20 seconds. Made with other attachments, including one for spooled cable, the unit has five speeds forward, one reverse and is offered in 10 models and three sizes of 3000, 10,000 and 30,000 pound capacities

Pocket-Size Tester

Fills need for testing scratch hardness and adhesion of industrial product finishes

SMALL enough to fit in the pocket, a new instrument developed by the Industrial Finishes Division of National Paint, Varnish and Lacquer Association, Washington, D. C., tests scratch hardness and adhesion of industrial product finishes. It is said to provide dependable determinations of the pressure on the scratching tool because the lever system reduces friction to one pivot.

Scale of the instrument is graduated from 0 to 20, each division equaling 100 grams, thereby permitting readings up to 200 grams with a standard weight and up to 3750 grams with two standard weights. It is reported that the results of accuracy compare with those obtained with larger and heavier type instruments usually confined to laboratory use.

For testing scratch hardness all four wheels of the instrument are placed on the finished panel or surface and drawn in a straight line across the film, using sufficient downward pressure to keep wheels in contact. The scratching tool must follow, not precede, the carriage. Tests are repeated, increasing or decreasing the scratching tool weight, until a barely perceptible mark is made. Or the size and character of the mark on various finishes with the same load are compared.

The same procedure is followed for testing adhesion, but the weight on the scratching tool is increased until it breaks through the finish film and exposes the base surface. At this point the adhesion reading is noted. Surfaces for both tests must be reasonably level, but it is said that use of a level is not necessary.

Floor Resurfacing Information

PROBLEMS of resurfacing service floors of various types are dealt with in a bulletin issued by United Laboratories Inc., Cleveland. Four general types of materials for renewing old floors and the conditions under which each type of material should be considered are outlined. In pointing out that each type of floor has its individual problems, the bulletin explains that there is no product available that may be considered a "cure-all" for every service floor problem.

Huge Billet Shear Cuts

drop forging slugs to accurate length for end use in automobile components

DROP FORGING slugs from 3 to 38 inches long in increments of 0.008-inch are cut by a huge new 700-ton billet shear for such end uses as ring gears, crankshafts and steering knuckles. The shear, built at the Bethlehem, Pa., plant of Bethlehem Steel Co., is for installation in the plant of an automobile manufacturer.

On one side of the 13½-foot high machine billets are fed in continuously by an automatic conveyor, emerging on the other side. Tumbling down a chute, the slugs cut from the billets by the machine will fall into a buggy under working conditions. The shear will be on a foundation several feet above the floor for this purpose.

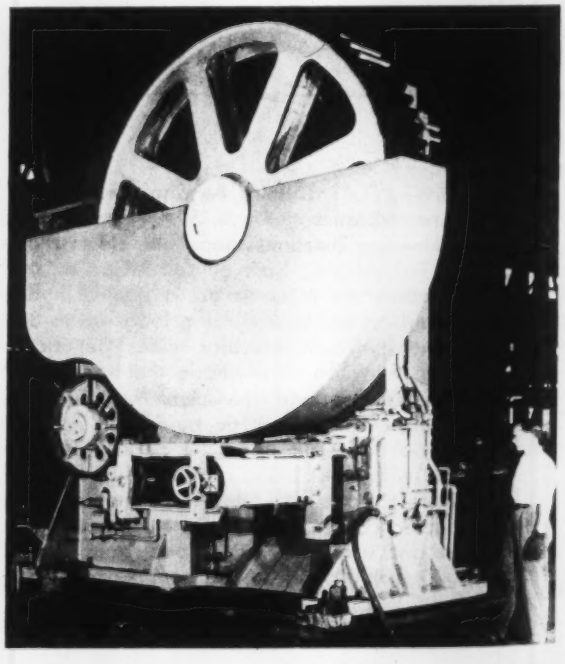
Capable of operating at 15 strokes per minute, the machine will cut mild steel billets up to 6 inches square, 105,000 pound tensile strength billets to 4 inches square, or two 3-inch high tensile steel billets at one time. The billets are advanced at the rate of about 140 feet per minute by a power feed table. This high speed would inflict a severe impact on the shear's gage, were it not air-cushioned to nullify the impact.

Easy Access—Swinging out of the way for access to the shear blade is the hinged gage, shown in the lower center of the picture below the gear housing. Through synchronization, this gage retracts before the blade cuts, allowing the slug to drop freely. With the aid of a long and a short peel, the gage measures either short or long lengths without requiring an awkwardly long gage. The handwheel on the gage adjusts the length of slug to be cut to the previously mentioned small increments.

The air-cushioned gage is said to promote accuracy in cutting by stopping the moving billet and spotting it in the correct position so that the slug length will always be the same. Shear also has wide and adjustable wearing surfaces on the guides for maintenance of correct alignment of the V-notched shear blade.

Powered by a 100 hp motor, the new shear has one gag roll, spring-cushioned to raise the billet above the V-notch in the frame after each cut. The gag roller rests in spring-cushioned brass bearings.

The air balancing cylinders on top compensate for the weight of the slide which is connected to the eccentric by the pitman, and which carries the top shear blade. The cushioning tank in the center absorbs the fluctuation. The bull gear is driven through an intermediate gear by the flywheel shaft.



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WHY SO MANY when 2 will do?

No need to complicate things. Look at it this way.

Extra equipment, just like extra alloy steels, can cause confusion and cost more money. For example, we know a number of plants that have found how economical it is to use just 2 alloy steels for production and maintenance work in making parts like gears, shafts, tool holders, etc. Our customers have found that 2 Carpenter alloy steels can actually replace many A.I.S.I. grades.

Think what that means in reduced alloy steel inventory, easier fabrication and less costly heat treatment. You can now use one tempering grade of alloy steel or one case-hardening grade on most jobs—instead of worrying about a large number of A.I.S.I. grades.

An unusual book called "2 Steels" tells all about Carpenter's simplified alloy steel program . . . 2 aircraft quality alloy steels that can replace many. Write for your copy of "2 Steels".

THE CARPENTER STEEL COMPANY

139 W. Bern Street, Reading, Pennsylvania

Only Carpenter Gives You This Way to Replace Many A. I. S. I. Grades with Just 2 Alloy Steels

Single Spindle Automatic

(*Concluded from Page 63*)

The "signal to index" comes from a limit switch tripped by a dog on the cam drum from which the tool slides on the turret are actuated. As a double check against premature indexing, this circuit is not closed until the draw bar of the turret slides trips a second limit switch at its retracted or "all clear" position.

Thereupon a pancake motor on the side of the outboard support goes into action to drive a worm wheel carrying a cam which rocks a bell crank which pulls the locking pin. Following this, the worm wheel sweeps the roller on a revolving arm between blocks on a Geneva mechanism disk. This indexes the turret through a pair of gears hidden behind the Geneva disk and the locking disk. Indexing ordinarily is by fifths of a revolution, there being five slides on the turret. However, the machine can be set up to "skip" turret positions when not all of the slides are used. The instant that an indexing step is accomplished, locking bolt reseats itself, current to indexing drive is cut off and a brake sets on the indexing motor shaft.

In addition to indexing time saved by this Geneva system, forming operations from cross slides can continue uninterruptedly throughout indexing phases of the cycle—as is the case in the job setup illustrated by Fig. 3. This is in keeping with the philosophy of "combined operations" to eliminate every possible second of "idle" or nonproductive time.

Spindle drive is from the pulley shaft through pickoff change gears to a jack shaft, then to a clutch shaft where three clutch controlled speed range gears provide three automatically controlled spindle speeds to each set of change gears—which incidentally are interchangeable with the feed change gears. As in the case of collet and stock feed control, and operation of cross slides and turret slides, the automatic control of spindle speeds is from the one main camshaft which runs through the base of the machine. Stock is fed by heavy, dual cam-compressed coil springs.

So-called "idle-time" actions—including opening and closing of collets, stock feed, and retraction of tool slides—which are powered from the main drive motor but not tied in directly with feed control, are carried out from the constant speed shaft. This is driven directly from the pulley shaft, and is independent of spindle speed or cutting feed. This automatically speeds up the "idle operations" and can be hand engaged when setting up the machine. Low speed and operating feed can be hand controlled by a separate lever at convenient operating position.

As is apparent from the job setup illustrated by Fig. 3, there are sturdy cross slides for forming at front and rear, and a third slide above the spindle primarily for cutting off. Each of these three slides is independently cam operated.

Feed control for the main camshaft is by direct drive from the work spindle. Thus, feed of slides constantly is in correct relation to spindle speed. With a few steel cams of different angles, plus the flexibility provided by the feed change gears, a standard range of feeds from 0.004 to 0.044-inch per revolution of spindle is attained. Coarse and fine feed ranges also are easily arranged. Threading and tapping is done from the turret slides by opening dies and collapsing taps—tripped automatically.

MUCH THINNER THAN THE TIN: Using this delicate hydrophil balance in the Pittsburgh research laboratory of Carnegie-Illinois Steel Co., a technician is about to perform a test to compute accurately how much oil clings to a big sheet of tin plate. So little cottonseed or palm oil is used that it is a "feel" rather than a quantity. Tin plate is passed through a weak emulsion of vegetable oil, then rinsed and the rinse water evaporated away. The remaining oil is spread so thin that an ounce would uniformly coat all four walls, ceiling and floor of a tin plate-lined room measuring 20 x 50 x 400 feet. This small amount of oil facilitates handling after plating and during inspection, aids the can manufacturer in his handling problems and causes lithograph inks to flow more smoothly during labeling operations

Describes Antirust Materials

DESCRIPTIVE data on a special protective oil for semipermanent rust protection to metal parts during production, storage or while awaiting shipment, is included in a 16-page illustrated booklet announced by Oakite Products Inc., New York. Oil is described as being of extremely low viscosity and imparting a thin protective film to ferrous surfaces for resistance to moisture, humidity, perspiration, residues and acid fumes. It is also said to displace water or moisture on metal surfaces.

Motors Withstand Shock

FIELD tests demonstrated that grease lubricated ball bearing motors for looms, built by Louis Allis Co. of Milwaukee, satisfactorily withstands the severe shock and vibration encountered in high speed weaving and at the same time it eliminates the necessity for frequent oiling. Tests are also said to have indicated that the smoothest loom drive is obtained without the use of external flywheels, but with a special stator and rotor design which provides medium to high slip.

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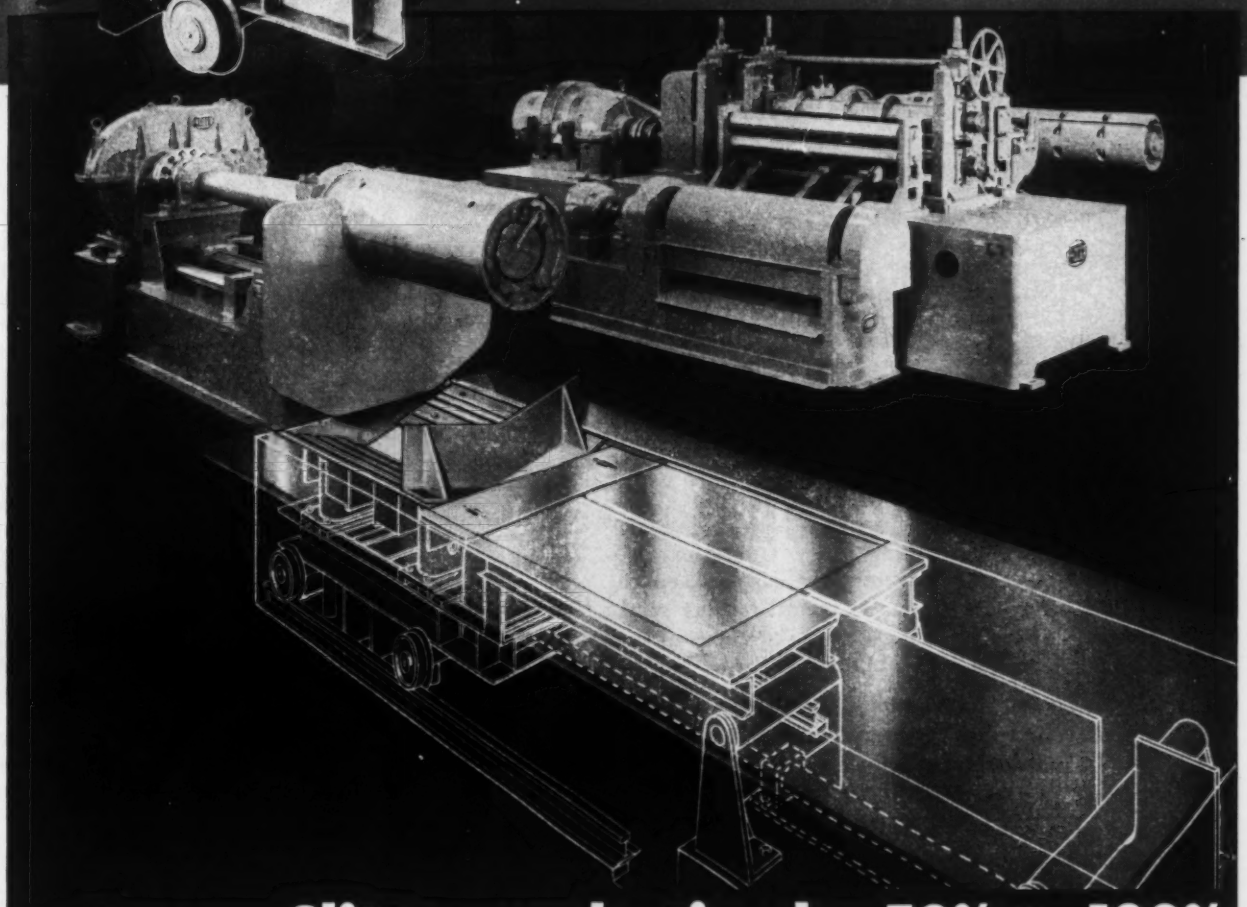
YODER COIL CARS



—step up Slitter production by 50% to 100%

Where greater slitter production is needed, instead of buying a new slitting line, you may be much better off by installing one or two Yoder Hydraulic Coil Cars of the latest, most efficient design. By saving time in loading the Uncoiler, unloading the Recoiler, and doing the banding elsewhere in the shop, coil cars are often the most economical means of increasing production and reducing cost.

Typically, 16 minutes per coil often spent on the operations just mentioned may be reduced to two or three minutes, reducing the cycle time from 25% to 50%.

The use of Coil Cars and other means of saving time and money in slitter operations are discussed in the new Yoder 76-page book on Slitting Lines and their Operation—yours for the asking.

Whether your requirements in slit strands are small or large, you will find the time studies and other information in this book of more than ordinary interest.

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5502 Walworth Avenue • Cleveland 2, Ohio

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COLD-ROLL-FORMING and auxiliary machinery
GANG SLITTING LINES for Coils and Sheets
PIPE and TUBE MILLS—cold forming and welding

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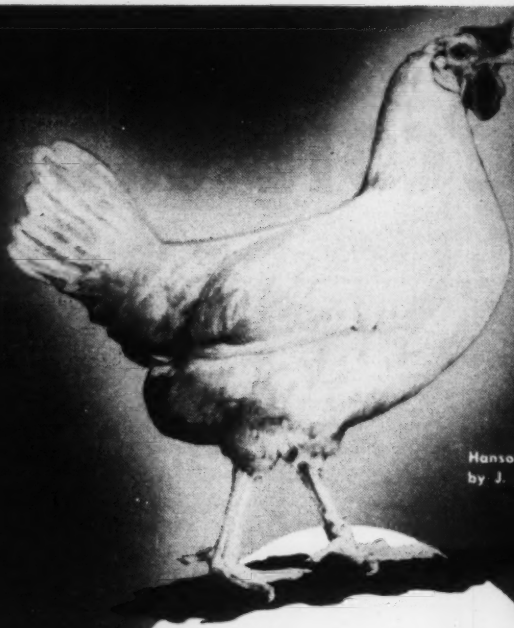


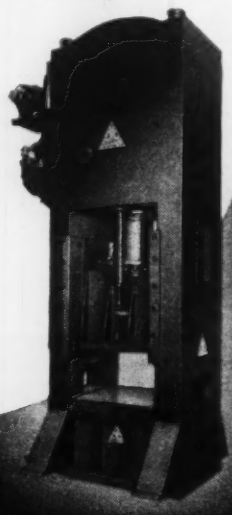
Hanson's Supreme, bred and owned by J. A. Hanson, Corvallis, Oregon.

Just another chicken?

This hen holds the world record for egg production by a leghorn—349 eggs in the 357-day official test. Her record, like the production record of a Clearing press, was not accidental, but resulted from long selective breeding toward a definite purpose.

Despite outward appearance, a Clearing is never "just another press". The factors that increase production are found in Clearing design and construction as a result of long selective development and study directed toward that definite purpose.

There's a lot more to press output than "strokes per minute". We'll be happy to explain — and prove — at your request.



CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

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CLEARING MACHINE CORPORATION

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New Principle Comparator

Checks parts through a magnifying lens against a calibrated pattern or reticle

CHECKING of linear measurements, circles, angles, radii, etc., formerly performed with a different device for each now is possible by one instrument which performs all of these inspection functions on small parts or small dimensions on large parts. This pocket comparator embodies a new principle by permitting the user to compare the part to be checked through a magnifying lens against a finely calibrated pattern or reticle.

Lens is a triplet-design aplanatic type which is said to have great accuracy and a magnification of about 7 to 1. Instrument was developed and is manufactured by Bell & Howell Co., and is distributed by National Tool Co., Cleveland. Reticle of the pocket comparator is calibrated for measuring lengths, widths, complete circles, radii and angles. Its upper part has lengths graduated into steps of 1/64, 1/32, 3/64, 3/32, 1/8, 3/16 and 1/4-inch.

There is also a linear rule of ½-inch with 0.005-inch increments and a 10 mm linear scale with 0.2 mm increments. Circles are shown graduated from 0.002 to 0.050-inch diameter and from 1/64 to 1/16-inch diameter. Lower half of the reticle is patterned to measure angles between 0 and 90 degrees in steps of 5 degrees and to measure radii from 1/16 to ⅜-inch.

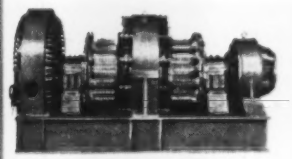
Instrument separates in the middle to permit cleaning the interior optical surfaces and for adjustment of focal length to meet the eye requirements of the individual using it. Transparent plastic material is used between lens and reticle to permit the entrance of light on the reticle and work to be measured. It is thought that use of the pocket comparator will reduce the use of more elaborate measuring devices. It can be used for checking radii, angles, chamfers, threads, small holes, lineal, radial and tangent dimensions, odd shapes, etc., on machined, stamped or cast production parts.

Don't Discard that Screwdriver!

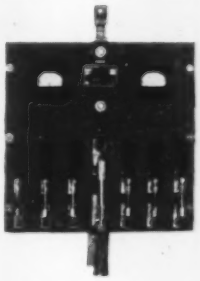
METHOD of renewing Phillips screwdrivers and screwdriver bits which have become worn or broken in service is a service available from Zephyr Mfg. Co., Inglewood, Calif. When renewed by this process, drivers conform to Phillips design and are said to equal new tools in service. Original hardness is not affected.

Facts you should know

about plating and polishing equipment and supplies.



To insure trouble-free commutation in low-voltage generators you should look for such construction features as fully insulated brush holders and rigging... copper pig-tail bar which eliminates current passage thru springs and fingers, and which in turn increases brush life... copper graphite brushes to provide optimum commutator efficiency... moulded-in "equaload" shunts to distribute brush load equally, reduce resistance. Bulletin No. G-102 describes these and other features inherent in all H-VW-M Low Voltage Generators.



You can be assured of positive current control in tank rheostats by selecting tank rheostats with heavy, knife-type switches ... plus a master switch which eliminates the necessity for operating several switches each time a tank is unloaded. Also look for generous size special alloy strip resistors which reduce current losses due to overheating and insure long life. These features are all built into H-VW-M Tank Rheostats. Bulletin No. TRA-526 provides complete details.

You can get more "mileage" out of buffs by remembering that buffs cost more than compounds and it's the compound that should do the work. Therefore, be sure and select the right compound ... one specifically designed for the particular cutting or coloring job so that the compound does the work and not the buff. H-VW-M makes *all* types ... hand or automatic, bar or liquid ... fully described in Bulletin No. BC-104.

Other important facts you should know are ... you can always get what you want from H-VW-M when you want it ... H-VW-M products are strategically warehoused for prompt service and delivery ... H-VW-M sales-engineers and laboratory technicians are always available for help in your production problems. It is this overall service and experience that have made H-VW-M *the central source of supply ... for over 70 years ... for all the needs* of the electroplating and polishing industry.

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H-VW-M

Manufacturers of a complete line of electroplating and polishing equipment and supplies

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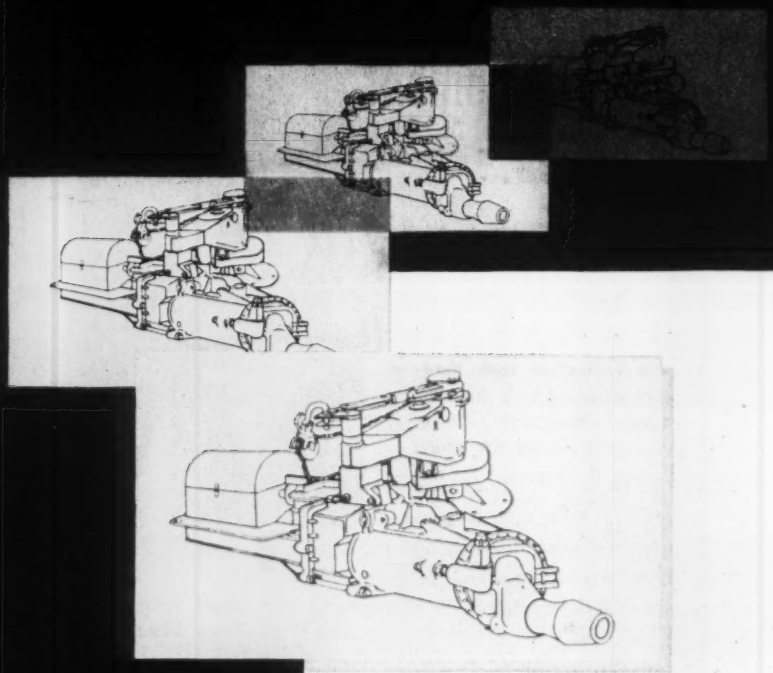
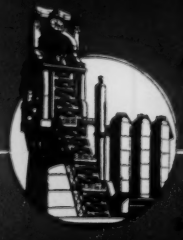
for ruggedly built
more efficient Clay Guns



Here are two very good reasons why Brosius Clay Guns are so highly practical to operate and maintain. First, they are backed by many years of specific blast furnace engineering skill and experience; and second, each gun is individually designed, machined, assembled, inspected, and tested at the Brosius factory. For more information and literature on sturdy low-cost electric-mechanical, electric-hydraulic or steam guns, simply write to us.



Edgar E. BROSIUS Company Inc.
SHARPSBURG - PITTSBURGH 15, PA.

New Books

Alloy Steels, Cast Iron and Non-Ferrous Metals, by F. Johnson, head of department of metallurgy, Central Technical College, Birmingham; cloth, 227 pages, 5¾ x 8¾ inches; published by Chemical Publishing Co. Inc., Brooklyn, N. Y., for $5; available from STEEL, Penton Building, Cleveland, O.

After describing the relation of quality to process of manufacture and defining the various steelmaking processes, this book devotes several chapters to alloy steel types, characteristics and metallurgical information. Each of the more popular alloy steels has considerable space devoted to heat treating processes, various applications, and characteristics peculiar to each type.

Heat treating, annealing, essential requirements, hardening, quenching and tempering are covered as related to high speed steels. In addition to providing a guide for the selection of tool steels, this chapter is devoted to some applications of heat treated steels as used for gears, die blocks and castings.

Composition, structure and heat-treatment of Meehanite, special duty, austenitic, malleable and other types of cast iron are included. Another chapter is devoted to the heat-treatment of nonferrous metals and alloys, including copper-zinc, copper-tin and copper-aluminum alloys. A final chapter is devoted to age-hardening. Liberal use is made of tables and diagrams for presentation of much of the factual material.

Grinding Practice (third edition) by Fred H. Colvin, editor emeritus *American Machinist,* and Frank A. Stanley, formerly editor, *Western Machinery and Steel World;* cloth, 419 pages, 6½ x 9¼ inches published by McGraw-Hill Book Co., New York, for $3.75; available from STEEL, Penton Building, Cleveland, O.

The field of grinding machines and abrasive wheels, showing what they do, how to operate, how to make best use of them on various types of work and the advantages in production economy that result from use of right machines and methods is the scope of the book. Changes made in this edition include rearranging much of the material to secure a more logical sequence and the addition of new information on different phases of grinding practice. This includes the new standard code for the marking of abrasive wheels.

Also included are the new standard capacity for cylindrical grinding machines and information on the new safety code for grinding wheels. Pre-

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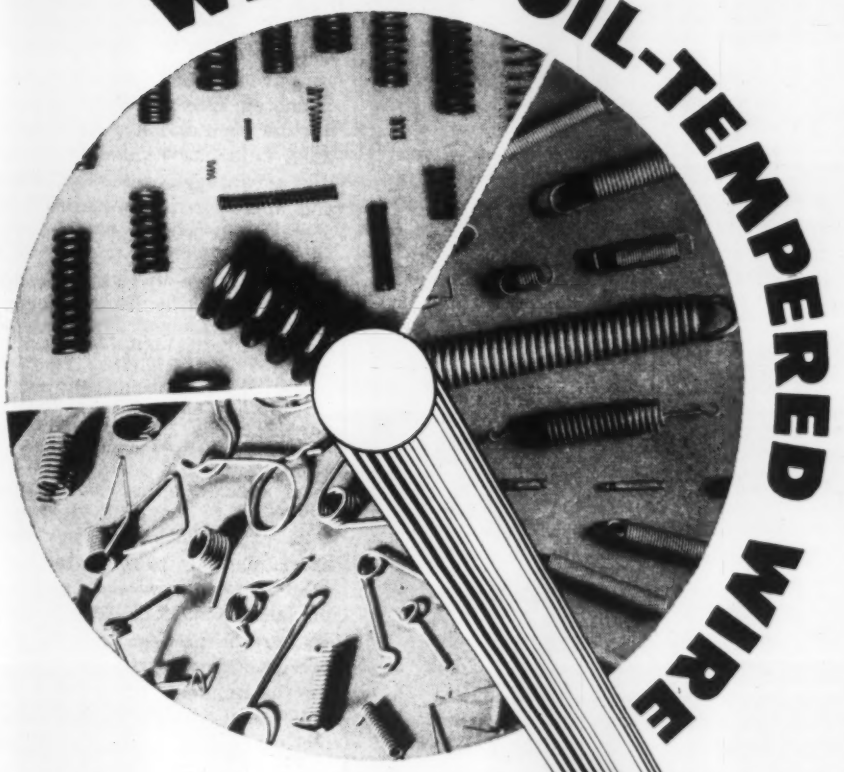

UNIFORM IN

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AND

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In common with other high carbon wires, oil-tempered wire can be as temperamental as an opera star unless it is handled with extreme care. Every step in processing calls for skilled craftsmanship — the kind of handling it gets in the hands of Wissco's many 25-year service men.

It's the knack which our metallurgists and mill men have in handling special wires that has made Wissco Oil-Tempered Wire an old time favorite with spring manufacturers. They like its uniformly high tensile strength and fatigue life.

You can obtain Wissco Oil-Tempered Wire in sizes from .009 to .5625 in coils, with diameters ranging from 8" to 72" and in cut lengths. Or, if you need any other type of high or low carbon steel specialty wire we can supply it. We make it round or shaped, in a wide variety of tempers, grades and finishes. Let us know your requirements.

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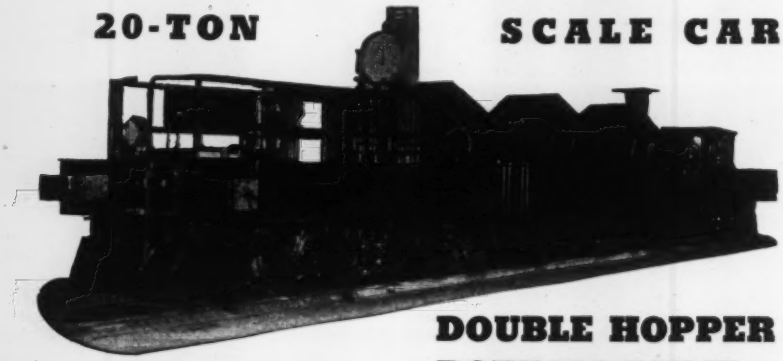
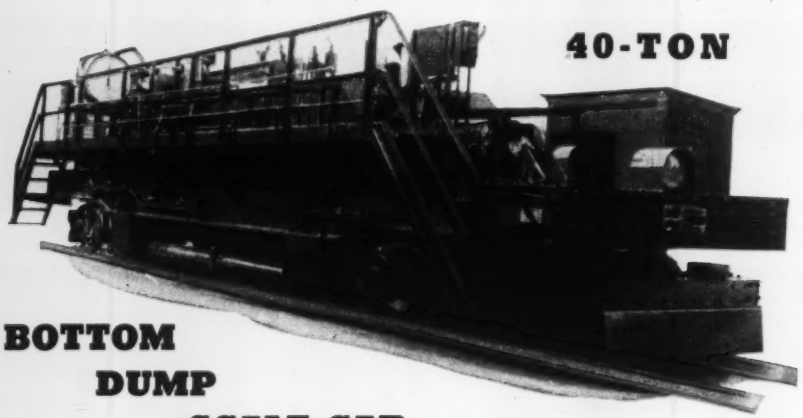
20-TON SCALE CAR



DOUBLE HOPPER BOTTOM DUMP

Car has Atlas underslung suspension scales with Atlas 24" scale Dial with chart recording. Air brakes and air-operated discharge gates. Cast steel side-frame trucks with Roller Bearings.

40-TON



BOTTOM DUMP SCALE CAR

Car has anti-friction bearings throughout, including axle mountings. Car has foot operated "Dead Man" control feature with air brakes inter-locked to apply automatically. Provided with ATLAS all-steel scales and 30" indicating dial. Type printing recorder attachment provides automatic weight registration at skip pit. All standard safety features provided including red marker lights and lights for illuminating the front of the bin.

Atlas Engineering Service is always at your service

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

cented is usable information on the use of diamond abrasive wheels, on wheels for cutting off work, complete with details as to speeds, wheel selection and wheel life, and on the use of small mounted wheels and abrasive points. Liberal use is made of photographs and drawings throughout the book and step-by-step instructions help the reader to understand the advantages, selection, setting-up and operation of machines for turning out all kinds of jobs.

Credit Manual of Commercial Laws—1950, edited by Henry H. Heimann, executive manager, National Association of Credit Men, W. Ralph Montgomery, and Richard G. Tobin, director of publications, National Association of Credit Men; cloth, 784 pages, 6¼ x 9¼ inches; published by National Association of Credit Men, New York, for $10.00; available from STEEL, Penton Bldg., Cleveland, O.

A large number of new laws and amendments to present statutes which deal with commercial transactions are presented in this 41st annual revision. The new edition, for example, presents four new laws regulating the assignment of accounts receivable, amendments in four states affecting chattel mortgage transactions and also amendments and new laws on other important subjects such as community property, bulk sales, mechanics liens, assumed names, factors liens, bad checks, commercial crimes and competancy of parties to a contract.

Inclusion of footnotes which amplify the text on the law of contracts are a new feature, these helping to qualify obscure or doubtful points concerning validity of a contract position. Not intended to be a substitute for a competent lawyer, the development of this annual book was thought necessary by the association in order to give a ready reference digest of all the laws affecting trade from the time the order is received until collection is made. Also included are a summary of state laws on such subjects as rights of married women, males and use taxes, state fair trade acts, assurred credit, jurisdiction of courts, limitation for civil actions and bonds on public improvement.

Standards of Tubular Exchanger Manufacturers Association (1949 edition); 94 pages; published by Tubular Exchanger Manufacturers Association Inc., New York, for $3 (paper) or $4 (fabrikoid); available from STEEL, Penton Building, Cleveland, O.

Intended for use by those concerned with the design, manufacture, specification, purchase, operation or maintenance of tubular exchangers, this wire-bound book is profusely illustrated. It covers such subjects

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as fabrication and performance, mechanical standards for petroleum refineries, commercial and general process applications, material specifications, fouling factors, temperature and temperature differences, heat transfer and pressure drop data, thermal properties of fluids, installation operation and maintenance, and characteristics of tubing.

This edition, the only one published since the original in 1941, is the work of the association's technical committee. It is being made available at cost and without restriction.

Directory of New England Manufacturers (14th edition); cloth, 752 pages, 8 x 11 inches; published by George D. Hall Co., Boston, for $30; available from STEEL, Penton Building, Cleveland, O.

Listing 13,000 manufacturers located in New England, 25,000 executives of these organizations, 3000 products and services and 3700 brand names, this extensive annual publication is said to include current authenticated information not available elsewhere from any single source. It is published with the editorial cooperation of the New England Council of Boston.

Book is divided into the following sections: An alphabetical section with detailed information of manufacturing company, including the name, address, other locations and officers; a geographical section in which manfacturers are listed by city or town and their products described; a product section which lists the manufacturers under products made; and a brand name section listing brand and registered trademark names used by New England manufacturers to identify their products.

National Transportation Policy, by Charles L. Dearing and Wilfred Owen; cloth, 459 pages, 6¼ x 9¼ inches; published by the Brookings Institution, Washington, D. C., for $4; available from STEEL, Penton Building, Cleveland, O.

Today's transportation problem, according to the authors, is traceable largely to the fact that congressional policies have failed to keep pace with transportation requirements. This analysis of the American transportation system is focused on the activities of the federal government which has become a major factor in current transport development and control. The book recommends establishment of a federal department of transportation and a new transport regulatory commission designed to produce a modern and efficient transportation system. It recommends the restoration to management of a larger measure of discretion in determining rate levels as well as the elimination of unnecessary subsidies.

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After the mechanical success of weldment pilot models, this manufacturer found it didn't answer any of his marketing problems.

Unitcast engineers gave him the answer. Keeping quality first, Unitcastings gave him low end costs, castings with more eye appeal, additional strength, greater safety and no misfits. Results: trailer hitch sales have increased several hundred percent—proving again that your customer will "beat a path" to a better Unitcasting, one that's correctly engineered for the job.

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Unitcast will welcome the opportunity to provide a "cast steel" answer for your parts problems, too. Our suggestions toward design, *while your product is still on paper,* may save you many dollars in time and future revisions! Write or call today! Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. *In Canada:* Canadian-Unitcast Steel, Ltd., Sherbrooke, Quebec.

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strip for action . . .

FOLLANSBEE POLISHED BLUE STRIP will give you real action in the production-line because it's furnished in coils for feeding right into your automatic machines. For the utmost efficiency and economy in continuous operations try this superior Follansbee Polished Blue in coils—the distinctive color is a real asset in any product.

making figurines for faddists

FOLLANSBEE POLISHED BLUE STRIP fits into many types of products, figurines or furnishings or fryers. The uniform-blue, high-gloss finish of Follansbee Polished Blue attracts discriminating buyers. In coils for automatic productioneering, and with mechanical and physical specifications to fit your needs, you'll find it worth while to tool for Follansbee Polished Blue and the other Follansbee Specialty Steels.

Cut Assembly Costs

(*Continued from Page* 59)

by one-third by moving jobs through faster. Assembly requires the application of about eighty ¾-inch square head nuts to a gate. With the previous hand-wrench method, 2½ days were required to assemble five gates. The wrench often slipped as the nuts were drawn tight, necessitating several attempts to tighten a single nut. The electric tool spins the nut and then tightens it, all in one quick operation, and cuts assembly time to about 1¾ days to every five gates.

Foreman of a foundry pattern shop estimates that approximately 50 per cent or more time is saved in pattern construction, repair and disassembly through using electric tools with screw driver attachments. In another foundry, the tool is being used as a screw driver for No. 12 and 14 wood screws with an estimated saving of 25 per cent on the overall pattern assembly job.

Air-Driven Applications — Because air-operated tools have been on the market longer than electric impact tools, their application to fastenings is even more extensive. Here are a few cases of the value of such air tools on the job—in dollars and cents savings on fastening operations.

A railroad shop assembled air line clamps to car trucks. After the drilling operation, tapping and bolting up were done by hand. A small air-operated tapper and a tool were put on the job. The investment of $324.00 paid for itself in 43 working days.

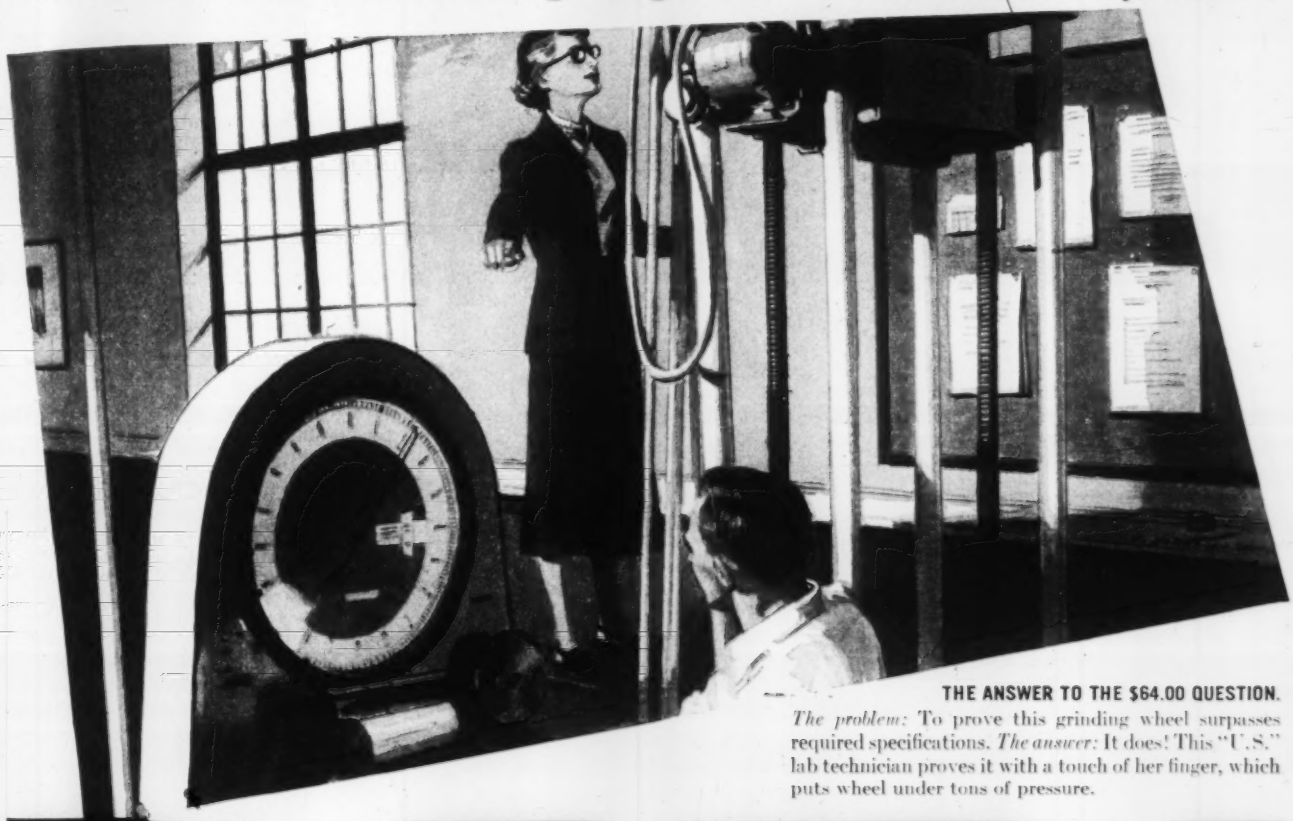
A structural steel company, fabricating large steel beams (60 x 45 feet) required three men working 2 days to complete fitting-up operation of one unit. Assembly consisted of bolting parts by hand, using a bolt in every eighth hole. The same men, using an air-powered tool, completed a unit in the amazingly short time of 1 hour. Here is how the air tool paid for itself in 4 hours of use:

The original operation required 48 man-hours (3 men, 2 days by hand). The air tool completed the job in 3 man-hours (3 men, 1 hour), thus saving 45 man-hours on the job. At an approximate hourly rate of $1.50 per man, $67.50 was saved on each unit. The cost of the air power equipment was $279.00. Divided by the saving per unit, the equipment paid itself off in 4.13 hours.

A large manufacturer of scales assembled the platform yoke and tie-bar on industrial scales by using a hand tool. The running down of sixteen 5/16 x 1¼-inch cap screws took 1 minute 41 seconds. The company put an air-powered impact tool on

Answers to 5,000,000 QUESTIONS

U. S. Rubber Laboratories create grinding wheels to solve millions of problems



THE ANSWER TO THE $64.00 QUESTION. *The problem:* To prove this grinding wheel surpasses required specifications. *The answer:* It does! This "U.S." lab technician proves it with a touch of her finger, which puts wheel under tons of pressure.

NO GUESSWORK HERE! "U.S." Lab experts have the know-how and know-all on the right wheel to do the best job. They're backed by 86 years of experience and research on the thousands of products made by United States Rubber Company.

WHAT'S YOUR QUESTION? Snagging castings? Grinding ball races? Slabs? Sauce Pans? Perhaps we can solve your specific grinding wheel problems as we have done on previous jobs, involving 5,000,000 possible combinations!

Whatever your problem on bonds or abrasives, our field engineers can give you accurate grinding wheel costs *in advance* and diagnose and solve your problems right in your plant. Write Grinding Wheel Department,

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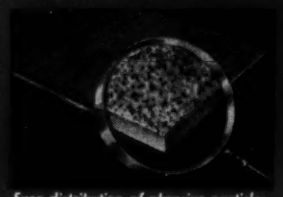
NOW! END SLIPPING ACCIDENTS WITH A.W. ALGRIP

(POSITIVE NON-SLIP FLOOR PLATE)

Non-slip—Even on Steep Inclines



Even distribution of abrasive particles shown by magnifying glass.

Prevents slipping on factory floors, walkways, etc.

Protects workmen and vehicles from slipping on ramps and loading platforms.

REVOLUTIONARY, NEW ABRASIVE ROLLED STEEL FLOOR PLATE

Now, for the first time you can prevent dangerous, expensive slipping accidents with A.W. ALGRIP ABRASIVE Rolled Steel Floor Plate. It's the non-slip floor plate that safety engineers, architects, purchasing agents and plant owners have always wanted.

A.W. ALGRIP is made by rolling abrasive grain as an integral part of the upper portion of steel plate. It retains its non-slip qualities for a lifetime, because as the surface wears new abrasive particles are constantly exposed.

Install A.W. ALGRIP for positive non-slip protection in all areas subjected to oil, grease or water on which men walk or climb . . . loading platforms, ramps, washroom floors, fire escapes, running boards and similar surfaces. A.W. ALGRIP prevents slipping even on steep inclines. And remember it's low in cost, easy to install, requires no maintenance, and is resistant to heat, fire and heavy traffic.

Write or use coupon for complete information about this amazing, new, non-slip floor plate now.

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

A Product of ALAN WOOD STEEL COMPANY

Conshohocken (18), Penna.

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Name _____ *Title* _____

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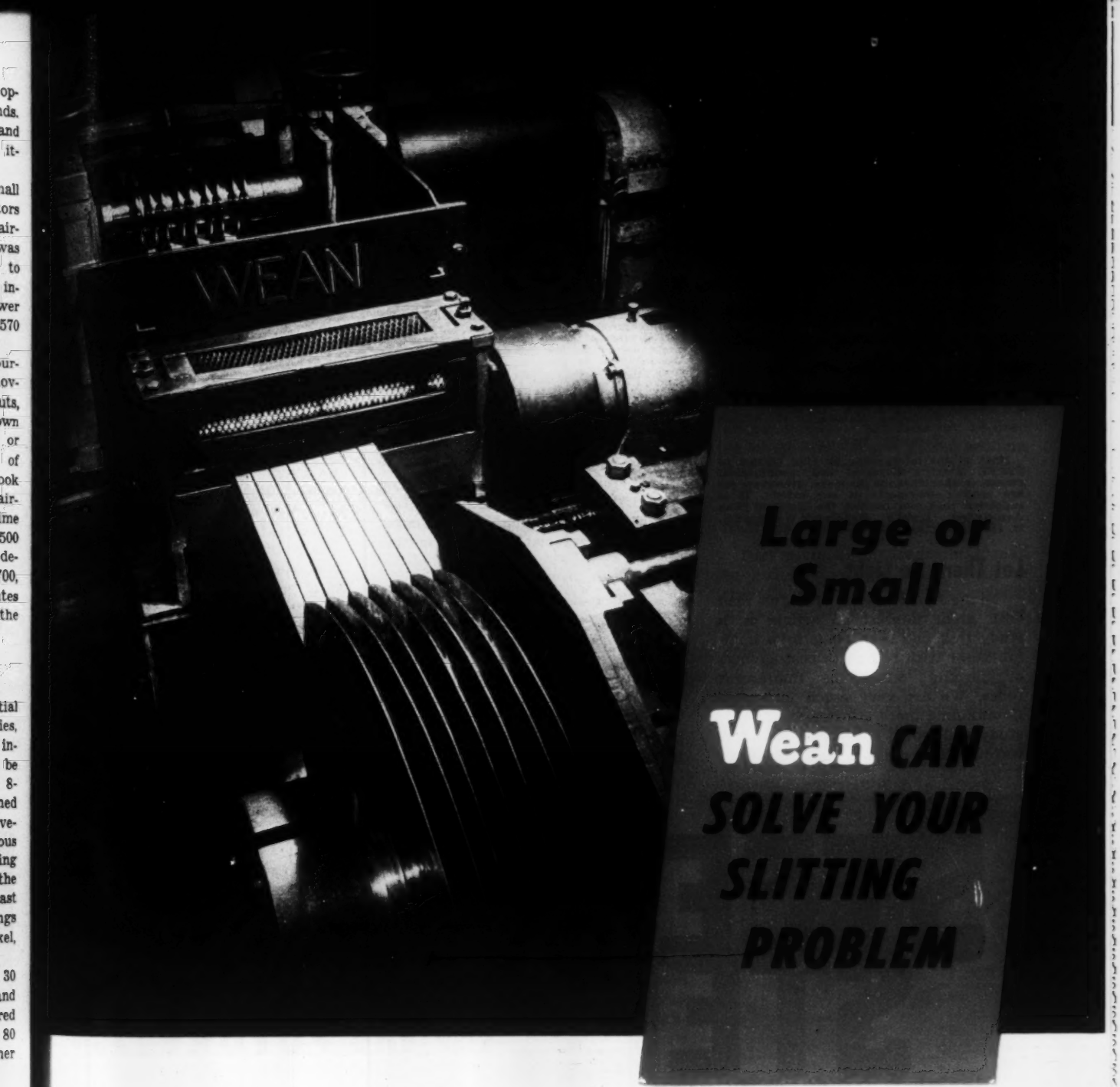

If you are in the business of handling strip steel or fabricating steel parts or products from strip steel you should give your slitting operation high consideration.

Well designed slitting lines enable you to reduce inventories, lower labor costs and eliminate expensive extras. Wean engineered slitting lines give you these important factors at lowest initial costs.

If you have a slitting problem—or merely desire a check on the efficiency of your present operation—call in Wean specialists.

Wean Equipment Corporation
CLEVELAND, OHIO

LETTERS *to the Editors...*

Uses of Slag

Do you have any available articles on the subject of furnace slag and its uses? If so, I should like to obtain a copy of what you have. My main interest is in the so-called "water-granulated" slag which is usually included in the lightweight aggregate description.

C. E. Widell
Transportation Director
Tennessee Manufacturers Association
Nashville, Tenn.

Most of the information on slag carried in STEEL is of a technical and metallurgical nature, rather than on its uses. However, we are sending tearsheets of one article. It is suggested that you contact the National Slag Association, Warner Building, Washington, D. C.—The Editors

Let There Be Light

In the Jan. 2 issue of STEEL, we read with great interest an article on a study that had been made by a manufacturer with regard to cost savings of turning off-and-on fluorescent tubes. We are very much interested in obtaining more information on this study and would appreciate your forwarding the name of the company which conducted such a study in order that we may correspond with them on this subject.

A. J. Liebman
Research Engineer
Dravo Corp.
Pittsburgh, Pa.

The electrical department of the automotive manufacturing company making the study prefers to remain anonymous. We suggest you might obtain further information from either Westinghouse or General Electric representatives in your city.—The Editor

Information Sent

Will you please send us a reprint of your article on the Fundamentals of Steelmaking in reference to tool steel. If you have any information on the color markings of tool steel we would appreciate this information too.

B. D. Moskowitz
Schiavone-Bonomo Corp.
Jersey City, N. J.

Material requested is being sent.—The Editors

Polish Up the Handles

I am interested in obtaining an automatic sanding machine, also polishing machine for wooden cutlery handles. Could you please advise me as soon as possible various sources of supply where I may be able to purchase such equipment. I also wish to purchase an automatic spoon polishing machine and would appreciate also if you could advise the names of manufacturers producing this machine.

Raoul Lassonde
St. Hyacinthe, Que.

This posed quite a research problem for our staff, but we have come up with several recommendations. A list of companies, with the type of machines they manufacture, and for the operations mentioned, is being sent. —The Editors

Matter of Definition

In your magazine of Nov. 15, 1948, on page 114, second line from the bottom, left column, it says: "Requiring 77,000 tons of coal monthly, the single battery—arranged in two groups of 53 ovens—will produce over 810 million cubic feet of gas for reheating furnace use."

It is the consensus of opinion here that the largest battery comprises 85 to 90 ovens. We would appreciate it if you would advise us as soon as possible whether or not this is correct.

C. E. Grigsby
General Refractories Co.
Philadelphia, Pa.

Our statement is correct. As we understand it, a coke oven battery has only one stack and may be comprised of any number of ovens. Although the J & L setup mentioned in the article is arranged in two groups of 53 ovens, it is still a single battery of 106 ovens because it is served by a single stack.—The Editors

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STEEL for the FUTURE...

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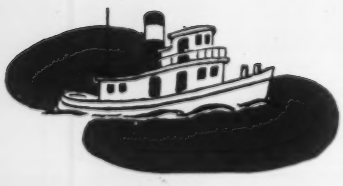

More and more in the marine industry, especially at AVONDALE MARINE WAYS . . . *steel* is used! In building and repairing ships of all types, in the fabrication of equipment for offshore oil drilling, in all the work AVONDALE does—*steel* is the material most used!

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New Products and Equipment

Permanent Mold Casting Machine

Castings poured of steel, cast, malleable or nodular iron, brass, bronze magnesium and aluminum may be produced with the model F permanent mold casting machine available from Centrifugal Casting Machine Co., P. O. Box 947, Tulsa, Okla. Ability to permit the operator to place the core in the drag half of the permanent mold while the parting line is in a horizontal plane allows use of either dry sand or green sand cores. After the core is placed in the drag half of the mold, it is closed

and rotated to the pouring position. After pouring it is rotated back to the horizontal position, the cope raised and the casting lifted out of the drag.

Mold is blown out, sprayed and is then ready for a new core. Production may be from 20 to 40 casts per hour, depending upon size and type of casting. Machine is supplied with all accessories, such as permanent molds, coreboxes, arbors, spraying equipment and spray wash. Molds up to 22 inches wide and 26 inches deep can be accommodated and castings up to 100 pounds in weight can be made.

Check No. 1 on Reply Card for more Details

Simulates Actual Conditions

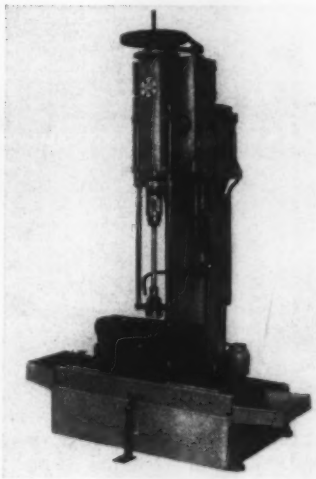
Physical tests simulating actual working conditions to disclose strength, endurance, etc., are possible on cables, wires, threaded parts, forgings, gears, etc., with Schenck dynamic and fatigue testing machines available from R. Y. Ferner Co., Boston 48, Mass. Built by Carl Schenck of Darmstadt, Germany, the machines are available in a wide variety of capacities. They provide for loads from 220 pounds to 450 tons reversed stresses at speeds of 200 to 2600 cycles per minute.

The speeds of testing cycles are so controlled over test periods of any length that different specimens may be subjected to identical treatment for comparative studies. Provision for studies in elevated temperatures, subzero atmospheres or submerged are carried out with auxiliary equipment. Automatic static preload control is furnished where required and regular units may be supplied for applied bending tests.

Check No. 2 on Reply Card for more Details

Hones 1 to 4-Inch Bores

All controls of the movement of the hydraulically reciprocated head are on the Uni-Control lever of the heavy duty semiproduction honing machine manufactured by Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 4, Mich. It will hone any



bore from 1 to 4 inches in diameter and up to 10 inches in length. Tool is "inched" into the bore, rotation is started and stopped and reciprocation speed regulated and tool withdrawn by manipulation of the one lever.

Tool is expanded by an adjusting sleeve on the head which does not rotate with the tool. Stock removal and size may be computed and controlled by a calibrated ratchet ring on this sleeve. It is adaptable to the reconditioning of cylinder bores and connecting rods.

Check No. 3 on Reply Card for more Details

Feeds Material Under Pressure

Material at atmospheric pressure may be fed into a zone which is under pressure or vacuum by a pressure feeder unit introduced by Hapman Conveyors Inc., 2405 West McNichols Rd., Detroit 21, Mich. Material is fed into the receiving hopper continuously at atmospheric pressure, then conveyed through the Pneumatrol into the pressure or vacuum section of the conveyor. It is then discharged into a container under the same pressure or vacuum. The Pneumatrol unit allows a differential in pressure between receiving point and discharge point and must be also contained in the return conveyor run, as the conveyor is a closed circuit.

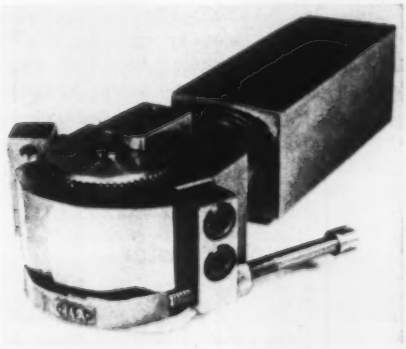
Rubber inner sleeve is mounted so that an annular and air-tight annular space is created between the inner sleeve and outer sleeve casing. For material temperatures above the range of rubber, silastic may be used up to 450° F. Water cooled sections may be introduced above this range.

Check No. 4 on Reply Card for more Details

Marker Eliminates Operation

Part numbers or trademarks may be roll-stamped on metal parts as they are processed in multiple spindle screw machines by an automatic marking device announced by Special Screw Products Co., 5445 Dunham Rd., Bedford, O. Designed for mounting between positions on the machines, the Automarx leaves all stations free for processing.

An adjustable head permits quick settings for round stock of various



materials ¼-inch in diameter and larger. A removable roll-stamp enables the markings to be quickly and easily changed for different parts. Depth of imprint may be regulated. Marking as the machine indexes, the device uses no production time.

Check No. 5 on Reply Card for more Details

Shifts To Either Side for Lifting

Forks may be shifted as much as 4 inches to the right or left of center with a hydraulically operated side-shifter attachment for Lift King and Worksaver fork trucks, made by Yale & Towne Mfg. Co., Roosevelt Blvd. and Haldeman Ave., Philadelphia 15, Pa.

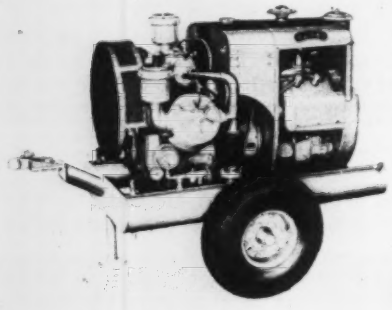
Increased flexibility makes it possible to spot load in odd corners, close

to walls, or in other confined areas. The side-shifter is easily removed from both types of trucks to permit installation of other accessories.

Check No. 6 on Reply Card for more Details

60 CFM Compressor

Employing stainless steel disk valves which are said never to carbon, the 3-cylinder air-cooled type 60 cfm air compressor, announced by Davey Compressor Co., Kent, O., is known as Super Chief model 60-WBD. It features an automatic centrifugal clutch which engages at 700



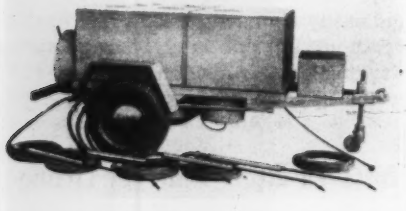
rpm. This disengages the compressor when the engine is cranked and facilitates easy starting.

Force feed lubrication by means of gear-driven pumps on both engine and compressor is incorporated. Any predetermined air pressure up to 100 pounds is automatically maintained by a built-in unloader system. With its tubular steel safety tow bar and balloon tires, it may be towed behind car or truck. Power is furnished by a model VP-4 four cylinder air-cooled Wisconsin engine.

Check No. 7 on Reply Card for more Details

Removes Grease Faster

The 300 gallons per hour capacity of the super-duty Hypressure Jenny steam cleaner, announced by Homestead Valve Mfg. Co., Coraopolis, Pa.,



will operate from one to four cleaning guns. Full operating pressure is reached within 2 minutes from a cold start. Standard equipment includes one ½-inch Hypower cleaning gun, one 25-foot length each of ½ and ¾-inch vapor hose and a choice of either gasoline engine or 1 hp electric motor.

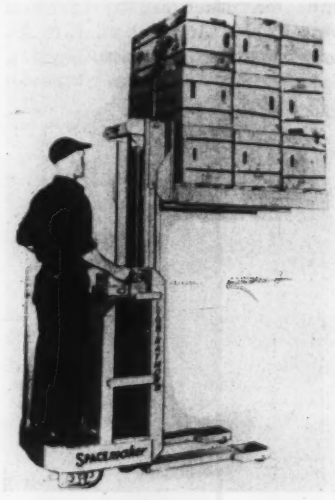
In less than 2 minutes it can be changed over for use as a heat generator with heat output equivalent to a 25 hp boiler. It may then be used for heating tanks of viscous fluids, thawing frozen cars, sterilizing, etc.

Check No. 8 on Reply Card for more Details

Increases Storage Space

Ability to tier 48 x 48-inch pallet loads at right angles from a 6-foot aisle is shown by the SpaceMaker electric tiering truck introduced by Lyon-Raymond Corp., 9166 Madison St., Greene, N. Y. Box skids measuring 24 x 36 inches may be right angle tiered from a 5-foot aisle.

Truck is furnished in three different types: Platform type for tiering



skids; fork type for tiering single face pallets; and straddle type for tiering two faced pallets. Light in weight, the truck may be used on upper floors of multistory buildings where floor and elevator capacity have low load limits.

Check No. 9 on Reply Card for more Details

Portable Ultrasonic Tester

Modifications which facilitate interpretation of test results are incorporated in the portable model of Reflectoscope ultrasonic instrument for testing materials, announced by Sperry Products Inc., Danbury, Conn. A reject control on the type UR, style 50E351 instrument gives the operator additional control of sensitivity by rejecting indications of small defects which do not affect the performance of the part or material under test.

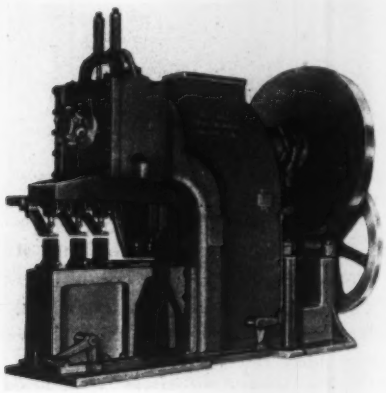
Instrument consists of a pulse-generator for generation of short pulses of electrical energy at various frequencies, a searching unit for converting the electrical energy into ultrasonic energy, an amplifier for increasing pulse amplitude sufficiently to cause an indication on a cathode-ray tube, a sweep generator to provide a time base for the cathode-ray tube and a marker generator which produces a square-wave trace to furnish a measurement of distance.

Check No. 10 on Reply Card for more Details

Structural and Fabricating Punch

A rated ram pressure of 235 tons, a 2¼-inch stroke and a throat depth of 28½ inches are designed into the No. 12 universal punch, offered by Kling Bros. Engineering Works, 1300 No. Kostner Ave., Chicago 51, Ill. For use in structural steel and fabricating shops, the machine is capable of punching a 2½-inch hole or the equivalent in 1¼-inch mild steel.

Two low die holders, three high die holders, two goose-neck die holders and necessary punching equipment to suit these holders are supplied. Machine can handle 3-inch I-beams to 36-inch H-beams and will



handle a broad range of flange punching without changing setups. Both flange and web punching can also be done without setup changes.

Check No. 11 on Reply Card for more Details

• • •

SELF-DUMPING HOPPER: A 1-yard capacity heavy duty self-dumping hopper, developed by Roura Iron Works Inc., Detroit 11, Mich., will withstand warping when handling red hot sprues and castings. It will fit any standard type lift truck and can be unloaded by the operator of the truck by lifting the patented instant release handle.

Check No. 12 on Reply Card for more Details

INDOOR CURRENT TRANSFORMERS: Type MR through-type current transformers for low voltage metering indoors with or without thermal demand meters are available from Westinghouse Electric Corp., Pittsburgh 30, Pa. They have an ac-

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high ratios ?

ONE OF 93

DE LAVAL DOUBLE REDUCTION WORM GEARS

De Laval double reduction speed reducers, consisting of combinations of double worm gear reductions, or helical and worm gear reductions, are available with overall ratios up to approximately 8000 to 1. De Laval single reduction worm gear speed reducers are available in ratios up to 90 to 1. If high ratios are your requirement, worm gear speed reducers are the answer—particularly if space is limited and reliability is important. A De Laval representative will help you pick the right size and type.

This double reduction De Laval Worm Gear Speed Reducer is available in many standard ratio combinations, with horizontal or vertical output shafts and is but one of 93 sizes and types of standard De Laval Worm Gear Speed Reducers.

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DE LAVAL

Worm Gear Division: De Laval Steam Turbine Co., Trenton 2, N.J.

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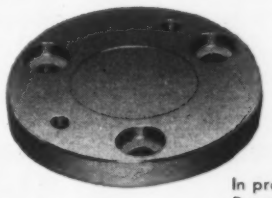
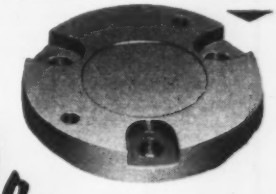


In producing this pump flange, Powdermet production saved 400%!



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curacy with ASA class 0.3 at burden B-0.1 and a continuous current rating of 200 per cent while not exceeding a temperature rise of 55° C. Transformers are for operation up to 600 v with primary current ratings of 200 or 400 amp to 0.5 amp.

Check No. 13 on Reply Card for more Details

BOX WITH HINGED DOOR: A new corrugated steel stacking box with a chain operated hinged door is offered by Palmer-Shile Co., Detroit 27, Mich. Door may be opened to any set angle by the chain. Boxes are built to dimensions and load capacity specified by the customer.

Check No. 14 on Reply Card for more Details

CEILING AIR DIFFUSER: Joined integrally with a square panel of lightweight metal, this adaptation of Kno-Draft adjustable air diffuser has been designed for use with all standard acoustical-type and rectangular ceiling units. Diffuser, made by W. B. Connor Engineering Corp., New York 16, N. Y., retains standard features of adjustability for angle of air discharge, air volume control, etc.

Check No. 15 on Reply Card for more Details

PRINTS ON GLASS, METAL: Apex Machine Mfg. Corp., New York 3, N. Y., has developed a hand-operated, offset machine that will print in any color on almost all nonporous surfaces, round, flat, concave or convex. Using type, cuts or electros, the machine prints by the transfer process.

Check No. 16 on Reply Card for more Details

NONSKID MAT: An oil resistant rubber mat, announced by Patterson-Ballagh, Los Angeles 54, Calif., has many industrial uses. Pattern design features large rubber blocks with a nonskid surface. Mat is grooved on underside to prevent slipping under wet or oily conditions.

Check No. 17 on Reply Card for more Details

VARIABLE TRANSFORMERS: Type 116 and 216 Powerstat variable transformers, made by Superior Electric Co., Bristol, Conn., have been improved. New design incorporates a new die cast aluminum terminal box on cord-plug models and new fusing arrangement. Type 116 operates from 115 v, 50/60 cycle source to deliver 0-135 v, 7.5 amp output. Type 216 has an output of 0-270 v, 3.0 amp from 230 v, 50/60 cycle, 1 phase.

Check No. 18 on Reply Card for more Details

AUTOMATIC GOVERNOR CONTROL: A new air turbine motor, developed by Onsrud Machine Works Inc., Chicago, Ill., features automatic governor control. The automatic governor is actuated by centrifugal force. Motor is designed to operate at 50,000 rpm and as long as this rotational speed is maintained, governor is not actuated. As speed decreases due to work load, governor becomes operative.

Check No. 19 on Reply Card for more Details

ORGANIC BRIGHTENER: A zinc plate brightener compound, designated as ARP No. 3, is introduced by Allied Research Products Inc., Baltimore, Md. It is supplied in liquid form for use in any type of zinc plating bath.

Check No. 20 on Reply Card for more Details

LOCATES DEFECTIVE CELLS: GS Hy-Rate battery cell tester No. 17 made by General Scientific Equipment Co., Philadelphia 32, Pa., instantly shows condition of 6 v battery. Prods are adjustable and will fit terminals on any battery. One prod can be moved in a specially designed slotted holder to obtain proper spacing to test batteries with cells mounted lengthwise.

Check No. 21 on Reply Card for more Details

ELECTRIC HAND DRYER: An electric hand dryer, available from National Dryer Corp., Chicago, Ill., dries hands in 20 seconds. Unit is 12 x 10 x 7 inches and base is mounted on the wall with four large screws or bolts. Dryer operates on 115 v, ac.

Check No. 22 on Reply Card for more Details

COATING: Xim flash bond, offered by H. Forsberg Co., Cleveland 14, O., is a synthetic liquid development that provides aluminum, galvanized iron, steel and other metal surfaces with adhesion to receive following finish or color coats. It stops rust in steel and other ferrous metals and prevents deterioration of exposed aluminum surfaces.

Check No. 23 on Reply Card for more Details

FOR AMMONIA APPLICATION: A new line of high speed refrigeration compressors for ammonia application has been developed by York Corp., York, Pa., to handle from 15 to 275 hp equivalent of refrigeration with improved economy. Designated as V/W compressors, units are available for use with remote condensing equipment and are designed with four, six, eight, 12 and 16 cylinders and for direct connection to motor.

Check No. 24 on Reply Card for more Details

BOXES FOR MOTORS: A line of terminal and conduit boxes for electric motors, offered by Kolton Electric Mfg. Co., Newark 5, N. J., is made of pressed steel to save weight and improve appearance of the motor. They are available in three sizes: Size 1 will take conduits from ½ to 1-inch; size 2, 1 to 1¼ inches and size 3, up to 2½ inches.

Check No. 25 on Reply Card for more Details

FLEXIBLE METAL CONDUIT: Chicago Metal Hose Corp., Maywood, Ill., introduces Geon covered flexible metal machine tool conduit. It may be used for electrical shielding purposes in many applications. It is resistant to moisture, coolants, greases and oils. Conduit is made in sizes from ⅜-inch ID to 2 inches ID.

Check No. 26 on Reply Card for more Details

BUCKET ELEVATOR CHAINS: Beaucalloy elevator chains, announced by Beaumont Birch Co., Philadelphia, Pa., are made of heat treated alloy steel. Projecting guards deflect material from chain joints and slotted boss ends prevent pin from rotating and protect cotter pin from wear. Links fold into place on sprocket or traction wheel and maintain almost steady contact throughout rotation.

Check No. 27 on Reply Card for more Details

FLOW GAGE: Improved Magna-Sight flow gage, made by Fischer & Porter Co., Hatboro, Pa., is available in brass, bronze, iron, steel and type 316 steel and in sizes from ¾ to 4 inches with maximum capacities from 3.5 to 250 gallons per minute. It can be used for clear and opaque liquids, slurries and other fluids. Temperatures up to 400° F can be accommodated.

Check No. 28 on Reply Card for more Details

SPRAYS LUBRICANT: A system for spray lubrication of mechanical conveyors has been developed by Manzel Inc., Buffalo, N. Y. Equipment consists of a timing mechanism and spray head mounted at a desirable location on conveyor and connected to the company's automatic spray lubricator. As each roller of conveyor strikes timing mechanism arm, it actuates an air valve causing lubricator to release an accurately aimed spray of oil onto the wearing parts.

Check No. 29 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

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Helpful Literature

74. Aluminum Spot Welding

Diversey Corp.—12-page illustrated booklet N. 5003 presents process for preparing aluminum and its alloys for spot welding. Process is explained, advantages listed and case histories cited.

75. Electrical Precipitator

Research Corp.—28-page illustrated brochure "Cottrell Process of Electrical Precipitation" describes gas cleaning equipment for recovering material of value, cleaning air or gases for subsequent use and prevention of air pollution. Basic types of equipment are described, and their use in variety of industries is depicted.

76. Stainless Steel

Allegheny Ludlum Steel Corp.—36-page illustrated brochure "Allegheny Metal in the Dairy Industry" discusses and depicts applications of stainless steel in the dairy industry. Included are sections on technology, corrosion resistance, available forms and fabrication of Allegheny stainless steel.

77. Fire Protection

Walter Kidde & Co., Inc.—4-page illustrated bulletin No. 1-1A deals with automatic fire protection for industry. Built-in system is explained from standpoint of both construction and principle of operation; and various components including fixed temperature thermostat, Lowe release, pressure trip and multijet nozzle are described.

78. Salt Baths

E. F. Houghton & Co.—32-page illustrated booklet explains company's liquid salt baths as applied to science of heat treatment of metals. Suitable salt mixtures are recommended for tempering, brazing, annealing, hardening, reheating and carburizing to obtain specific results.

79. Magnetic Starter

Arrow Hart & Hegeman Electric Co.—4-page illustrated folder form No. A4 deals with size 3 type RA magnetic starter which has right-angle balanced mechanism, is shock and vibration resistant, is small in size, has large contacts which are fully enclosed, and has hardened roller bearing joints.

80. Shapers

Smith & Mills Shapers, Inc.—16-page illustrated booklet "Smith & Mills Shapers" presents data on 12 and 14-in. heavy duty crank shapers; 20 and 24-in. standard duty crank shapers and 16, 20, 25, 28, 32, and 36-in. heavy duty crank shapers. Also described are parallel jaw, double screw and moldmakers' vises.

81. Steel Wire Products

Colorado Fuel & Iron Corp.—36-page illustrated catalog entitled "Principal Products of CF&I and Subsidiaries" lists various steel and wire products. Typical items include semi-finished and hot-rolled steel, rails and accessories, wire and wire specialties, wire rope, welded wire fabric, netting, fencing, springs automotive products and conveyor belts.

82. Toggle Clamps

General Welding Co.—2-page illustrated leaflet "General Clamps" covers six models of fast-operating toggle clamps in sizes from 1¾ to 3⅝ in. They can be used on jigs and fixtures for high production in drilling, milling and welding or any other operation that requires rapid clamping and release of work.

83. Wire Cloth

Buffalo Wire Works Co.—4-page illustrated form No. 599 presents applications of tinned milling grade wire cloth for separating, sorting and cleaning flour, chemicals, powders, seeds, foods and other dry materials. Standard mesh, roll widths and gages are presented in tabular form.

84. Link & Clevis Design

Lincoln Electric Co.—Illustrated machine design sheet No. 104 shows variety of links and clevises which can be made economically by means of arc welding. Designs for 15 different types are depicted in sketches.

85. Cleaning Mills

N. Ransohoff, Inc.—20-page illustrated publication "Ransohoff Cleaning Mills" depicts and describes automatic star return, wet method, cleaning mills for castings and sprues. Work is tumbled in large amount of stars which supports work, reaches all parts of castings for thorough cleaning and at same time prevents excessive mill wear.

86. Prospect Control

Remington Rand Inc.—4-page illustrated booklet KD 539 describes two modern record systems designed to keep management in close control of sales development. Outlined are Prospect Development and Service Follow-Up Visible Record System, both of which are designed to develop, direct and concentrate sales effort and to reduce cost per sale.

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HELPFUL LITERATURE

87. Dry Lubricant

Alpha Corp.—4-page bulletin No. 52 describes Molykote dry lubricant and antiseizing compound. Applications listed include use where bearing pressures are beyond capacity of conventional lubricants such as in threaded connections, in press fitted assemblies and in sliding surfaces of machinery and instruments not yet worn in.

88. Air Hoists

Ingersoll-Rand Co.—8-page illustrated form No. 5020 is devoted to methods of hoisting and hauling materials with air power. Covered are Air Bloc hoist with lifting capacity of 700 lb, single-drum Utility hoists with capacities from 750 to 3500 lb, and overhead air hoists with capacities ranging from 500 to 20,000 lb. Specifications are tabulated for convenience.

89. Hard Solder Flux

Special Chemicals Co.—2-page illustrated leaflet "Kwikflux" and attached stock list deal with this hard soldering, brazing and welding flux for nearly all ferrous and nonferrous metals and alloys. Material cleans metal surface and covers it with protective film to exclude air. Excess flux washes off in hot water.

90. Truck Lift Gate

Anthony Co.—2-page illustrated leaflet PLG-1 describes 800-lb capacity hydraulic elevating gate for ½ and ¾-ton trucks. Unit is operated by twin hydraulic cylinders. Hydraulic pump is driven by truck fan belt and equipped with throwout clutch and single-lever control. Unit stops automatically at ground and floor level, or can be held at any elevation.

91. Rotary Shears

Kling Bros. Engineering Works—8-page illustrated bulletin No. 245A presents information on many types and sizes of rotary shears manufactured by company for cutting straight lines, rings and circles; for making flanges, joggles and offsets; and for cutting reverse curves, bevels and odd shapes.

92. Fork Truck

Baker-Raulang Co., Baker Industrial Truck Div.—4-page illustrated bulletin 1310 portrays type FT electric fork truck to handle up to 3000-lb and 48-in. loads. Major operating features are pointed out, and full specifications are tabulated. With maximum load, truck has travel of 510 fpm and lift of 26 fpm.

93. Alloy Reference Chart

Cooper Alloy Foundry Co.—6-pag 1950 Reference Chart contains com prehensive analysis of stainless, cor rosion resistant and heat resistant al loy castings. It presents in detail al loy types; Cooper alloy type number and comparative designations of ACI AISI, SAE and ASTM.

94. Lock Nuts

Palnut Co.—4-page illustrated fold er "Palnut Lock Nuts" relates tw case histories of use of lock nuts t solve special problems. Various ad vantages of units are discussed such as easy application and ability t hold load-carrying nut to origina tightness under severest vibration stress and load.

95. Abrasive Belts

Minnesota Mining & Mfg. Co.—32 page illustrated booklet "Step Up Production", Volume 2, includes case history examples and technical data on grinding and polishing with abra ive belts. Techniques of use on variet of metals are pictured, and prefi ishing process is discussed.

96. Industrial Soldering

Soldering Specialties—4-page illus trated bulletin entitled "How to Spee up Soldered Assemblies with Solde Preforms" tells why, how and whe to use preformed solder shapes. Ap plications in many diverse fields ar charted to aid user in proper selec tion of material.

97. Broaches

American Broach & Machine Co.— 32-page illustrated catalog No. 49 lists internal and surface broaches broach pullers, broaching machine and fixtures. Keyway broaching, re sharpening and care of machines, and internal and surface broaching oper ations are discussed also.

98. Belt Conveyor Idlers

Chain Belt Co.—26-page illustrated bulletin No. 463-R presents complete information on impact-cushioning troughing, rubber-covered spiral re turn, troughing, flat belt, return, self aligning troughing and return, and other roller bearing belt conveyor id lers. Other belt conveyor accessories are described also.

99. Roll Marking Tools

New Method Steel Stamps, Inc.— 4-page illustrated bulletin No. NM-49 covers line of standard automatic roll marking tools for screw ma chines. Installation and operating in structions, index adjustment proce ure and directions for changing rol dies are included.

100. Fire Tube Boiler

Kewanee Boiler Corp.—8-page il lustrated catalog 88-8 is descriptive of Square-Heat type R boiler for oil gas, stoker or hand-fired coal. De signed and built for medium size buildings, eight sizes are rated 74 to 3000 sq ft of steam radiation.

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Market Summary

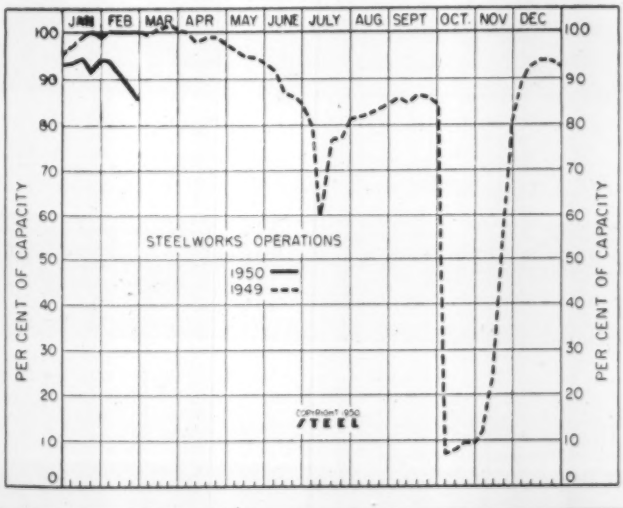
SHARP drop in steelmaking operations is indicated this week. Severe curtailment in the national ingot rate by Mar. 1 appears a certainty unless coal mining is resumed in large volume before then. At the bottom of their coal piles, most steelmakers have no alternative but to drastically curtail production. Since the beginning of February the ingot rate has dropped 8.5 points. Now it is poised for a nosedive of 20 to 30 more points in the matter of a few days. Blast furnace operations already have been severely curtailed and will be further cut this week. Many stacks have been banked. Still more are on reduced wind. Actually, iron ouput is down much more than indicated by the number of idled stacks, slack wind reducing furnace yields in some cases as much as 50 per cent.

INGOT OPERATIONS— Full impact of open-hearth furnace and bessemer curtailments already effected and ordered is not reflected in the 4.5 point drop in the estimated national ingot rate to 85.5 per cent of capacity last week. The mills actually were operating below that average at the weekend. Youngstown district has been hardest hit so far, the district steel rate dropping 15 points to 75 per cent.

SUPPLY—Further tightening in steel supply looms with rolling mill operations being seriously hampered. Shortages of semifinished steel are being felt. Rolling mill schedules are being disrupted, resulting in a slowing down in shipments which will intensify as more mills are idled over the next week or so. Producers are falling behind on shipment promises. Especially acute supply conditions threaten in the light, flat-rolled products which have been relatively scarce for months. In other products the outlook is somewhat less alarming, but even in these classifications serious supply difficulties are expected should mill suspensions be extended. Tonnage carryover from first quarter certainly will be substantial and force deferment of scheduled second quarter shipments. In fact, talk already is heard of likely revision in customers' flat-rolled steel quotas for second quarter.

DEMAND— Though metalworking shops face operating difficulties due to power and coal shortages they are continuing to order steel without letup. In fact, an increase in pressure for finished steel shipments appears to be accompanying steel production curtailment. Heavier specifying is reported in the light, flat-rolled products and carbon bars. Plates and shapes also are slightly more active, and even alloys and specialties are getting more attention from users. To only minor extent does this accelerated demand reflect consumers' strike-fright efforts to stockpile before mill shipments are cut off. Most of it stems from a genuine pickup in requirements from various directions. Automotive demand, pressing for months, shows no sign of letup. Meanwhile, seasonal expansion in various metalworking lines is getting under way. Farm implement makers are ordering more actively. So are heavy equipment builders, such as road machinery, etc. Airplane program needs are rising. Building steel requirements are increasing with an active construction season just ahead. Railroad car builders are showing more interest in tonnage than they have for many months.

PRICES—Reflecting a narrowing in the price spread quoted on wire, STEEL's finished steel arithmetical price composite last week rose to $93.18 from $93 the previous week. The weighted price index on finished steel, based on Pittsburgh prices, held unchanged at 156.13. Price composites also were unchanged on No. 2 foundry iron at $46.47, on basic iron at $45.97, and on malleable iron at $47.27. Tone of the scrap market is stronger but the steelmaking scrap composite held steady last week at $27.67.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Feb. 25	Change	Same Week 1949	Same Week 1948
Pittsburgh	88	— 7.5	97.5	93
Chicago	92.5	— 6*	101.5	92
Eastern Pa.	73	— 2	97	91
Youngstown	75	—15	105	102
Wheeling	90	— 1	92.5	90
Cleveland	97	— 2*	100.5	95
Buffalo	96	— 5.5	104	86
Birmingham	82	None	100	100
New England	78	— 2	88	85
Cincinnati	96	— 5	103	90
St. Louis	89	+11.5	89.5	77.5
Detroit	106	+ 3	104	90
Western	88	+ 2.5	..	..
Estimated national rate	85.5	— 4.5	100	93.5

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.

* Change from revised rate.

Composite Market Averages

	Feb. 23 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	155.05	100.65
Index in cents per lb...	4.230	4.230	4.230	4.200	2.727
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$93.18	$93.00	$93.00	$97.77	$57.55
No. 2 Fdry Pig Iron, GT	46.47	46.47	46.22	46.63	24.67
Basic Pig Iron, GT.....	45.97	45.97	45.72	46.22	24.00
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.34	25.29
Steelmaking Scrap, GT..	27.67	27.67	26.83	38.17	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Feb. 23 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh....	3.45	3.45	3.45	3.35–55	2.15
Bars, H.R., Chicago.....	3.45	3.45	3.45	3.35	2.15
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95–4.25	2.65
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25–30	2.10
Shapes, Std., Chicago.....	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.40–60	2.20
Plates, Chicago	3.50	3.50	3.50	3.40	2.20
Plates, Coatesville, Pa. ...	3.60	3.60	3.60	3.75	2.20
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.45	2.20
Plates, Claymont, Del. ...	3.60	3.60	3.60	3.95	2.20
Sheets, H.R., Pittsburgh..	3.35	3.35	3.35	3.25–30	2.20
Sheets, H.R., Chicago.....	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh...	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago.....	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh..	4.40	4.40	4.40	4.40	3.65
Strip, H.R., Pittsburgh....	3.25	3.25	3.25	3.25–70	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25–30	2.10
Strip, C.R., Pittsburgh....	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago.....	4.30	4.30	4.30	4.00–25	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–50	2.90
Wire, Basic, Pittsburgh...	4.50	4.50	4.50	4.15–50	2.60
Nails, Wire, Pittsburgh...	5.30	5.30	5.30	5.15–6.30	2.80
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$6.70	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$63.00	$63.00	$63.00	$61.00	$40.00
Sheet bar, mill (NT)	57.00–58.00	57.00–58.00	57.00–58.00	67.00	34.00
Wire rods, 7/32-⅜", Pitts. .	3.85	3.85	3.85	3.40–4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	50.30	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago.....	46.50	46.50	46.50	46.00–50	25.00
No. 2 Fdry, Valley.....	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.80	26.84
No. 2 Fdry, Birm.....	42.38	42.38	39.38-42.38	43.38	21.38
No. 2 Fdry.(Birm.)Del Cin.	49.08	49.08	46.08	49.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts...	$32.00	$32.00	$30.00	$39.00	$20.00
No. 1 Heavy Melt. E. Pa..	23.50	23.50	23.00	39.50	18.75
No. 1 Heavy Melt. Chicago	27.50	27.50	27.50	34.00	18.75
No. 1 Heavy Melt. Valley..	31.25	31.25	30.25	37.75	20.00
No. 1 Heavy Melt. Cleve..	28.25	28.25	27.25	37.25	19.50
No. 1 Heavy Melt. Buffalo	28.25	28.25	27.75	39.50	19.25
Rails, Rerolling, Chicago..	40.50	40.50	39.50	45.75	22.25
No. 1 Cast, Chicago.....	41.00	40.50	40.50	41.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl...	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl. .	15.50	15.50	15.50	17.00	7.75
Oven Fdry., Chicago.....	21.00	21.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	18.50	18.50	23.50	12.00
Zinc, E. St. Louis.....	9.75	9.75	9.75	17.50	8.25
Lead, St. Louis	11.80	11.80	11.80	21.30–35	6.35
Tin, New York	74.25	74.50	76.00	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	27.25	27.25	28.75	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark, del	50.63	51.13	51.63	52.13
Brooklyn, N.Y., del.	....	52.79	53.29	....
Birmingham District				
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward, Ala. W15	41.88	42.38	....	....
Cincinnati, del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda, N.Y., W12	46.00	46.50	47.00	....
N. Tonawanda, N.Y. T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester, N.Y., del.	48.63	49.13	49.63	....
Syracuse, N.Y., del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary, Ind. C3	46.00	....	46.50	....
Indiana Harbor, Ind. I-2	46.00	....	46.50	....
So. Chicago, Ill. W14, Y1	46.00	46.50	46.50	....
So. Chicago, Ill. C3	46.00	....	46.50	47.00
Milwaukee, del	47.89	48.39	48.39	48.89
Muskegon, Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain, O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie, Pa. I-3	46.00	46.50	46.50	47.00
Everett, Mass. E1	....	50.50	51.00	....
Fontana, Calif. K1	52.00	52.50	....	....
Geneva, Utah G1	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
LosAngeles, SanFrancisco, del.	53.70	54.20	....	....
GraniteCity, Ill. M10	47.90	48.40	48.90	....
St. Louis, del. (incl. tax)	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Minnequa, Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland, Pa. P6	46.00	46.50	46.50	47.00
Pitts, N.&S. sides, Ambridge, Aliquippa, del.	47.19	47.69	47.69	48.19
McKeesRock, del.	46.95	47.45	47.45	47.95
Lawrenceville, Homestead, McKeesport, Monaca, del	47.44	47.94	47.94	48.44
Verona, del.	47.90	48.40	48.40	48.90
Brackenridge, del.	48.13	48.63	48.63	49.13
Bessemer, Pa. C3	46.00	....	46.50	47.00
Clairton, Rankin, So. Duquesne, Pa. C3	46.00	....	....	....
McKeesport, Pa. N3	46.00	....	....	47.00
Sharpsville, Pa. S6	46.00	46.50	46.50	47.00
Steelton, Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Struthers, O. S16	46.00	....	....	....
Swedeland, Pa. A3	48.00	48.50	49.00	49.50
Philadelphia, del.	49.44	49.94	50.44	50.94
Toledo, O. I-3	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51	....	....
Troy, N.Y., R2	48.00	48.50	49.00	....
Youngstown District				
Hubbard, O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield, O. del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson, O. G2	$57.00
Jackson, O. J1	57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls, N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt, allowed K2.	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

LylesTenn. T3	$60.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, Intermediate, A7	$51.00
Steelton, Pa. B2	54.00
Philadelphia delivered	57.00
Troy, N.Y. R2	54.00

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UNIVERSITY OF MICHIGAN LIBRARIES

Semifinished and Finished Steel Products

Mill prices as reported to STEEL, Feb. 23, 1950; cents per pound unless otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)
Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 ... 51.00

BILLETS, BLOOMS & Slabs Carbon, Rerolling (NT)
Bessemer,Pa. C3 .... $53.00
Clairton,Pa. C3 ..... 53.00
Conshohocken,Pa. A3 .. 58.00
Ensley,Ala. T2 ..... 53.00
Fairfield,Ala. T2 ..... 53.00
Fontana,Cal. K1 ..... 72.00
Gary,Ind. C3 ..... 53.00
Johnstown,Pa. B2 .... 53.00
Lackawanna,N.Y. B2 .. 53.00
Munhall,Pa. C3 ..... 53.00
Sharon,Pa. S3 ..... 57.00
So.Chicago,Ill. C3 .... 53.00
So.Duquesne,Pa. C3 .. 53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 .... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2 ..... 63.00
Clairton,Pa. C3 ..... 63.00
Cleveland R2 ..... 63.00
Conshohocken,Pa. A3 .. 65.00
Detroit R7 ..... 63.00
Ensley,Ala. T2 ..... 63.00
Fairfield,Ala. T2 ..... 63.00
Fontana,Calif. K1 .... 82.00
Gary,Ind. C3 ..... 63.00
Geneva,Utah G1 ..... 63.00
Houston,Tex. S5 ..... 71.00
Ind.Harbor,Ind. I-2 ... 63.00
Johnstown,Pa. B2 .... 63.00
Lackawanna,N.Y. B2 .. 63.00
LosAngeles B3 ..... 82.00
Munhall,Pa. C3 ..... 63.00
Seattle B3 ..... 82.00
So.Chicago C3,R2,W14 .. 63.00
So.Duquesne,Pa. C3 .. 63.00
So.SanFrancisco B3 .. 82.00
Warren,O. C17 ..... 63.00

Alloy (NT)
Bethlehem,Pa. B2 ... $66.00
Buffalo R2 ..... 66.00
Canton,O. R2, T7 .... 66.00
Conshohocken,Pa. A3 .. 68.00
Detroit R7 ..... 66.00
Fontana,Calif. K1 .... 82.00
Gary,Ind. C3 ..... 66.00
Houston,Tex. S5 ..... 74.00
Ind.Harbor,Ind. Y1 .... 66.00
Johnstown,Pa. B2 .... 66.00
Lackawanna,N.Y. B2 .. 66.00
LosAngeles B3 ..... 86.00
Massillon,O. R2 ..... 66.00
Midland,Pa. C18 ..... 66.00
Munhall,Pa. C3 ..... 66.00
Sharon,Pa. S3 ..... 66.00
So.Chicago C3,R2,W14 .. 66.00
So.Duquesne,Pa. C3 .. 66.00
Warren,O. C17 ..... 66.00
Youngstown Y1 ..... 66.00

SHEET BARS (NT)
Mansfield,O. E6 ..... $58.00
Sharon,Pa. S3 ..... 57.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Ind.Harbor,Ind. I-2 ... 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 .... 76.00

SKELP
Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.15
Warren,O. R2 ..... 3.15
Youngstown C3, R2 ... 3.15

WIRE RODS
AlabamaCity,Ala. R2 .. 3.85
Buffalo W12 ..... 3.85
Cleveland A7 ..... 3.85
Donora,Pa. A7 ..... 3.85
Fairfield,Ala. T2 ..... 3.85
Houston,Tex. S5 ..... 4.25
Ind.Harbor,Ind. Y1 .... 3.85
Johnstown,Pa. B2 .... 3.85
Joliet,Ill. A7 ..... 3.85
LosAngeles B3 ..... 4.65
Minnequa,Colo. C10 ... 4.10
Monessen,Pa. P7 ..... 3.85
No.Tonawanda,N.Y. B11 .. 4.10
Pittsburg,Calif. C11 ... 4.50
Portsmouth,O. P12 .... 3.85
Roebling,N.J. R5 ..... 3.95
So.Chicago,Ill. R2 .... 3.85
SparrowsPoint B2 .... 3.95
Sterling Ill.(1) N15 .... 3.85
Struthers,O. Y1 ..... 3.85
Torrance,Calif. C11 .... 4.65

STRUCTURALS
Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 ..... 3.40
Bessemer,Ala. T2 ..... 3.40
Bethlehem,Pa. B2 ..... 3.45
Clairton,Pa. C3 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Houston,Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2 ... 3.40
Johnstown,Pa. B2 .... 3.45
KansasCity,Mo. S5 .... 4.00
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.00
Minnequa,Colo. C10 ... 3.75
Munhall,Pa. C3 ..... 3.40
Niles,Calif.(22) P1 .... 4.02
Phoenixville,Pa. P4 ... 3.30
Portland,Oreg. O4 ..... 3.90
Seattle B3 ..... 4.05
So.Chicago,Ill. C3, W14 . 3.40
So.SanFrancisco B3 ... 3.95
Torrance,Calif. C11 .... 4.00
Weirton,W.Va. W6 .... 3.40

Alloy Stand. Shapes
Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05

H.-S. Low-Alloy Stand. Shapes
Aliquippa,Pa. J5 ..... 5.15
Bessemer,Ala. T2 ..... 5.15
Bethlehem,Pa.(14) B2 .. 5.20
Clairton,Pa. C3 ..... 5.15
Fairfield,Ala. T2 ..... 5.15
Fontana,Calif. K1 ..... 5.75
Gary,Ind. C3 ..... 5.15
Ind.Harbor,Ind. I-2, Y1 . 5.15
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y.(14)B2 5.20
Munhall,Pa. C3 ..... 5.15
So.Chicago,Ill. C3 ..... 5.15
Struthers,O. Y1 ..... 5.15

Wide Flange
Bethlehem,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 .... 3.40

H-S., L-A. Wide Flange
Munhall,Pa. C3 ..... 5.10
So.Chicago,Ill., C3 .... 5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ... 4.20
Lackawanna,N.Y. B2 .. 4.20
Munhall,Pa. C3 ..... 4.20
So.Chicago,Ill. C3 .... 4.20
Weirton,W.Va. W6 .... 4.20

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 3.50
Aliquippa,Pa. J5 ..... 3.50
Ashland,Ky.(15) A10 .. 3.50
Bessemer,Ala. T2 ..... 3.50
Clairton,Pa. C3 ..... 3.50
Claymont,Del. W16 .... 3.60
Cleveland J5, R2 ..... 3.50
Coatesville,Pa. L7 ..... 3.60
Conshohocken,Pa. A3 .. 3.60
Ecorse,Mich. G5 ..... 3.75
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.50
Geneva,Utah G1 ..... 3.50
Harrisburg,Pa. C5 ..... 3.50
Houston,Tex. S5 ..... 3.50
Ind.Harbor,Ind. I-2, Y1 . 3.50
Johnstown,Pa. B2 ..... 3.50
Lackawanna,N.Y. B2 .. 3.50
Minnequa,Colo. C10 ... 4.30
Munhall,Pa. C3 ..... 3.50
Pittsburgh J5 ..... 3.50
Seattle B3 ..... 4.40
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. C3, W14 . 3.50
SparrowsPoint,Md. B2 .. 3.50
Steubenville,O. W10 .... 3.50
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 .... 3.50
Youngstown C3, Y1.... 3.50

PLATES (Universal Mill)
Fontana,Calif. K1 .... 4.40

PLATES, Carbon, A.R.
Fontana,Calif. K1 ..... 5.25

PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 .. 4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown,Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 .... 4.40
SparrowsPoint,Md. B2 .. 4.40

PLATES, Wrought Iron
Economy,Pa. B14 ..... 7.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.35
Bessemer,Ala. T2 ..... 5.35
Clairton,Pa. C3 ..... 5.35
Cleveland J5, R2 ..... 5.35
Conshohocken,Pa. A3 .. 5.35
Ecorse,Mich. G5 ..... 5.60
Fairfield,Ala. T2 ..... 5.35
Fontana,Calif. K1 ..... 5.95
Gary,Ind. C3 ..... 5.35
Geneva,Utah G1 ..... 5.35
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1. 5.35
Johnstown,Pa. B2 ..... 5.35
Munhall,Pa. C3 ..... 5.35
Pittsburgh J5 ..... 5.35
Sharon,Pa. S3 ..... 5.35
So.Chicago,Ill. C3 .... 5.35
SparrowsPoint,Md. B2 .. 5.35
Warren,O. R2 ..... 5.35
Youngstown Y1 ..... 5.35

FLOOR PLATES
Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 .. 4.55
Harrisburg,Pa. C5 ..... 4.55
Ind. Harbor, Ind. I-2 .. 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ... 3.75
Ashland,lcl(15) A10 ... 4.25
Cleveland,cl R2 ..... 4.10
Warren,O.,cl R2 ..... 4.10

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 .. 3.45
Aliquippa,Pa. J5 ..... 3.45
Alton,Ill.(1) L1 ..... 3.45
Ashland,Ky.(17) A10 .. 3.45
Atlanta,Ga. A11 ..... 3.60
Bessemer,Ala. T2 ..... 3.45
Buffalo R2 ..... 3.45
Canton,O. R2 ..... 3.45
Clairton,Pa. C3 ..... 3.45
Cleveland R2 ..... 3.45
Ecorse,Mich. G5 ..... 3.65
Emeryville,Calif. J7 ... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1. 3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Marion,O. P11 ..... 3.35
Midland,Pa. C18 ..... 3.45
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 ... 3.85
Niles,Calif. P1 ..... 4.17
N.Tonawanda,N.Y. B11 . 3.45
Pittsburg,Calif. C11 ... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
Seattle B3, N14 ..... 4.20
So.Chicago C3, R2, W14. 3.45
So.Duquesne,Pa. C3 ... 3.45
S.SanFran.,Cal. B3 .... 4.20
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 ... 4.15
Weirton,W.Va. W6 .... 3.45
Youngstown C3, R2 .... 3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 3.45
Atlanta A11 ..... 3.60
Johnstown,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Niles,Calif. P1 ..... 4.17
Pittsburgh(23) J5 .... 3.45
Portland,Oreg. O4 ..... 4.20
SanFrancisco S7 ..... 4.00
Weirton,W.Va. W6 .... 3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ..... 3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 3.95
Buffalo R2 ..... 3.95
Canton,O. R2, T7..... 3.95
Clairton,Pa. C3 ..... 3.95
Ecorse,Mich. G5 ..... 4.25
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 3.95
Houston,Tex. S5 ..... 4.35
Ind.Harbor,Ind. I-2, Y1. 3.95
Johnstown,Pa. B2 ..... 3.95
KansasCity,Mo. S5 .... 4.55
Lackawanna,N.Y. B2 .. 3.95
LosAngeles B3 ..... 5.00
Massillon,O. R2 ..... 3.95
Midland,Pa. C18 ..... 3.95
So.Chicago C3, R2, W14. 3.95
So.Duquesne,Pa. C3 ... 3.95
Struthers,O. Y1 ..... 3.95
Warren,O. C17 ..... 3.95
Youngstown C3 ..... 3.95

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 ..... 4.20
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 4.20
Youngstown C3 ..... 4.20

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.20
Bessemer,Ala. T2 ..... 5.20
Bethlehem,Pa. B2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland R2 ..... 5.20
Ecorse,Mich. G5 ..... 5.40
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 ..... 6.25
Gary,Ind. C3 ..... 5.20
Ind.Harbor,Ind. I-2, Y1. 5.20
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 .. 5.20
Pittsburgh J5 ..... 5.20
So.Duquesne,Pa. C3 ... 5.20
Struthers,O. Y1 ..... 5.20
Youngstown C3 ..... 5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 ..... 4.15
Ambridge,Pa. W18 .... 4.15
BeaverFalls,Pa. M12,R2. 4.15
Buffalo B5 ..... 4.15
Camden,N.J. P13 ..... 4.63
Carnegie,Pa. C12 ..... 4.15
Chicago W18 ..... 4.15
Cleveland A7, C20 ..... 4.15
Detroit P17 ..... 4.30
Donora,Pa. A7 ..... 4.15
Ecorse,Mich. G5 ..... 4.35
Elyria,O. W8 ..... 4.15
FranklinPark,Ill. N5 .. 4.15
Gary,Ind. R2 ..... 4.15
Hammond,Ind. L2, M13. 4.15
Hartford,Conn. R2 .... 4.55
Harvey,Ill. B5 ..... 4.15
LosAngeles R2 ..... 5.55
Mansfield,Mass. B5 .... 4.55
Massillon,O. R2, R8 ... 4.15
Midland,Pa. C18 ..... 4.15
Monaca,Pa. S17 ..... 4.15
Newark,N.J. W18 ..... 4.55
Plymouth,Mich. P5 .... 4.40
Pittsburgh J5 ..... 4.10
Putnam,Conn. W18 .... 4.55
Readville,Mass. C14 .... 4.55
St.Louis,Mo. M5 ..... 4.55
So.Chicago,Ill. W14 .... 4.15
SpringCity,Pa.(5) K3 .. 4.55
Struthers,O. Y1 ..... 4.15
Waukegan,Ill. A7 ..... 4.15
Youngstown F3, Y1 .... 4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 ..... 4.90
Ambridge,Pa. W18 .... 4.90
BeaverFalls,Pa. M12 .. 4.90
Bethlehem,Pa. B2 ..... 4.90
Buffalo B5 ..... 4.90
Canton,O. R2, T7 ..... 4.90
Carnegie,Pa. C12 ..... 4.90
Chicago W18 ..... 4.90
Cleveland A7, C20..... 4.90
Detroit P17 ..... 5.05
Donora,Pa. A7 ..... 4.90
Elyria,O. W8 ..... 4.90
Gary,Ind. R2 ..... 4.90
Hammond,Ind. L2, M13. 4.90
Hartford,Conn. R2 ..... 5.20
Harvey,Ill. B5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.90
Mansfield,Mass. B5 .... 5.20
Massillon,O. R2, R8 ... 4.90
Midland,Pa. C18 ..... 4.90
Monaca,Pa. S17 ..... 4.90
Newark,N.J. W18 ..... 5.20
Plymouth,Mich. P5 .... 5.10
So.Chicago,Ill. R2, W14. 4.90
Struthers,O. Y1 ..... 4.90
Waukegan,Ill. A7 ..... 4.90
Warren,O. C17 ..... 4.90
Worcester,Mass. A7 .... 5.20
Youngstown F3, Y1.... 4.90

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 .. 3.45
Alton,Ill.(6) L1 ..... 3.45
Atlanta,Ga. A11 ..... 3.60
Buffalo R2 ..... 3.45
Cleveland R2 ..... 3.45
Emeryville,Calif. J7 ... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1. 3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 ... 4.25
Niles,Calif. P1 ..... 4.17
Pittsburg,Calif. C11 ... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SandSprings,Okla. S5 .. 4.35
Seattle,Wash. B3, N14.. 4.20
So.Chicago,Ill. R2 ..... 3.45
So.Duquesne,Pa. C3 .... 3.45
So.SanFrancisco B3 .... 4.20
SparrowsPoint,Md. B2 .. 3.45
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Youngstown C3, R2.... 3.45

BARS, Reinforcing (Fabricated; to Consumers)
Huntington,W.Va. W7 .. 4.50
Johnstown, ¼-1" B2 .. 4.35
LosAngeles B3 ..... 5.00
Marion,O. P11 ..... 4.25
Seattle B3, N14 ..... 5.10
So.SanFrancisco B3 ... 5.00
SparrowsPt., ¼-1" B2 .. 4.35
Williamsport,Pa. S19 .. 4.35

RAIL STEEL BARS
ChicagoHts.,Ill.(3) 1-2.. 3.30
ChicagoHts.,Ill.(4) 1-2.. 3.45
FortWorth,Tex.(26) T4.. 4.33
Hntngtn,W.Va.(3) W7.. 3.45
Moline,Ill.(3) R2 ..... 3.35
Williamsport(2,3) S19 .. 3.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14 . 9.50
Economy,Pa.(D.R.)B14 11.00
Economy(Staybolt) B14. 11.30
McK.Rks.(S.R.) L5 .... 8.60
McK.Rks.(D.R.) L5 .. 11.25
McK.Rks.(Staybolt) L5. 12.75

BARS, Hot-Rolled Ingot Iron
Ashland,Ky. A10 ..... 3.70

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 .. 3.35
Ashland,Ky.(8) A10 ... 3.35
Butler,Pa. A10 ..... 3.35
Cleveland J5, R2 ..... 3.35
Conshohocken,Pa. A3 .. 3.45
Ecorse,Mich.(8) G5 .... 3.55
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.25
Gary,Ind. C3 ..... 3.35
Ind.Harbor,Ind. I-2, Y1. 3.35
Irvin,Pa. C3 ..... 3.35
Lackawanna,N.Y. B2 .. 3.35
Munhall,Pa. C3 ..... 3.35
Niles,O. N12 ..... 3.50
Niles,O. M4 ..... 3.75
Pittsburg,Calif. C11 ... 4.05
Pittsburgh J5 ..... 3.35
Sharon,Pa. S3 ..... 3.35
So.Chicago,Ill. W14 .... 3.35
SparrowsPoint,Md. B2 .. 3.35
Steubenville,O. W10 ... 3.35
Torrance,Calif. C11 .... 4.05
Warren,O. R2 ..... 3.35
Weirton,W.Va. W6 .... 3.35
Youngstown C3, Y1 .... 3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 .. 4.50
Dover,O. R1 ..... 4.65
Ind.Harbor,Ind. I-2 .... 4.40
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.10
Niles,O. M4 ..... 4.65
Torrance,Calif. C11 .... 5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.05
Conshohocken,Pa. A3 .. 5.05
Ecorse,Mich. G5 ..... 5.25
Fairfield,Ala. T2 ..... 5.05
Fontana,Calif. K1 ..... 6.74
Gary,Ind. C3 ..... 5.05
Ind.Harbor,Ind. I-2, Y1. 5.05
Irvin,Pa. C3 ..... 5.05
Lackawanna(35) B2 ... 5.05
Pittsburgh J5 ..... 5.05
Sharon,Pa. S3 ..... 5.05
So.Chicago,Ill. C3 .... 5.05
SparrowsPoint(36) B2 .. 5.05
Warren,O. R2 ..... 5.05
Weirton,W.Va. W6 .... 5.05
Youngstown C3, Y1 ... 5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2..... 6.20
Ecorse,Mich. G5 ..... 6.40
Fontana,Calif. K1 ..... 7.10
Gary,Ind. C3 ..... 6.20
Ind.Harbor,Ind. I-2, Y1. 6.20
Irvin,Pa. C3 ..... 6.20
Lackawanna(37) B2 ... 6.20
Pittsburgh J5 ..... 6.20
Sharon,Pa. S3 ..... 6.20
SparrowsPoint(38) B2 .. 6.20
Warren,O. R2 ..... 6.20
Weirton,W.Va. W6 .... 6.20
Youngstown Y1 ..... 6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	4.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.15
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Gavannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS,Well Casing

Torrance,Calif. C11	4.85

SHEETS, Drum Body

Pittsburg,Calif. C11	*4.05*
Torrance,Calif. C11	*4.05*

SHEETS, Aluminized

Butler,Pa. A10	7.75

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville, O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.60
Gary,Ind. C3	6.50
Ind.Harbor I-2	6.50
Irvin,Pa. C3	6.50
Yorkville,O. W10	6.50

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Yorkville,O. W-10	8.10

SHEETS, Coated Ternes, 12 lb

Yorkville,O. W10	8.95

SHEETS, Culvert. No. 16

	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
GraniteCity G4	5.40	5.70
IndianaHarbor I-2	5.20	5.45
Irvin C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt, B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R. (22 Ga.) Coils (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeeachBottom,W.Va. W10	...	6.95	7.45	8.45	9.25
Brackenridge,Pa. A4	...	...	7.45	8.45	9.25
Follansbee F4 (cut length)	...	...	6.95	7.95	8.75
GraniteCity,Ill. G4	...	...	7.65	8.65	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Vandergrift,Pa. C3	...	*6.70*	*7.20*	*8.45*	*9.25*
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (24 Ga. Base)

Mansfield,O. E6	5.90	6.20	6.70	7.95	8.75
Niles,O. M4	5.65	5.95	6.45	...	...
Niles,O. N12	...	6.45	6.95	...	...

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom,W.Va. W10	9.80	10.35	11.05	11.85
Brackenridge,Pa. A4	9.80	10.35	11.05	...
Follansbee F4 (cut length)	9.30	9.85	10.55	11.35
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	...	...	...
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80
Vandergrift,Pa. C3	*12.35*	*13.20*	*14.20*

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Gran.City,Ill. G4	7.50	7.70
Ind.Harb. I-1, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.90
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP,Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Conshohocken,Pa. A3	3.35
Detroit M1	3.55
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	3.90
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	*4.15*
Berea,O. C7	*4.60*
Bridgeprt,Conn.(10) S15	4.15
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.40
Detroit, D2	4.40
Detroit M1	4.35
Dover,O.(40) G6	*4.15*
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.15
Fontana,Calif. K1	5.40
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.50
Mattapan,Mass.(21) T6	4.65
Middletown,O. A10	4.15
NewBritain(10) S15	4.15
NewCastle,Pa. B4, E5	4.15
NewHaven,Conn. A7, D2	4.65
NewYork W3	5.00
Pawtucket,R.I.(11) N8	4.70
Pawtucket,R.I.(21) N8	4.65
Riverdale,Ill. A1	4.30
Sharon,Pa.(30) S3	4.15
SparrowsPoint,Md. B2	4.15
Trenton,N.J. (13) R5	4.65
Wallingford,Conn. W2	4.65
Warren,O.(25) T5	4.15
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y., B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W.Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R. I. N8:					
Cleve.orPitts.Base (29)	4.55	5.50	6.10	8.05	10.35
Worcester,Base (29)	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.50	6.10	8.05	10.35

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	9.35	11.30	13.90

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel&Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Clev. Cld.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

UNIVERSITY OF MICHIGAN LIBRARIES

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	3.60
Youngstown C3	3.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	*5.90*
Donora,Pa. A7	*5.90*
Duluth A7	*5.90*
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass(12) N6	6.20
Monessen,Pa. P7	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	*6.20*
Waukegan,Ill. A7	*5.90*
Worcester,Mass. A7	*6.20*
Worcester J4, T6, W12	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	*5.35*
Buffalo W12	5.35
Cleveland A7	5.35
Dover,O. G6	*5.35*
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7	5.35
Pawtucket,R.I.(11) N8	5.70
Pawtucket,R.I.(12) N8	5.65
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	*8.45*
Crawfordsville,Ind M8	8.60
Fostoria,O. S1	8.45
Johnstown,Pa. B2	7.70
Kokomo,Ind. C16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	*8.45*
Worcester,Mass. T6	8.75
Worcester,Mass. A7	*8.75*

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland C20	4.50
Cleveland A7	4.50
Crawfordsville,Ind. M8	4.65
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
LosAngeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark,6-8ga. I-1	5.15
No.Tonawanda B11	4.90
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7, T6	4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen P7	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

ROPE WIRE

	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	7.50	7.80	8.20
Monessen,Pa. P7	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.05	8.05	8.30
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	7.60	7.90	8.30
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	7.60	7.90	8.30
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfrdsvil. M8	5.50	5.75
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy,Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	*6.30*	*6.55*
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	*6.30*	
Worcester A7	5.65	5.90

WIRE (16 gage)

	An'ld. Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdsvil M8	9.95	11.45
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.35	10.85
Pitts.,Cal. C11	*10.15*	*11.65*
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Galv'd ACSR for Cores

Roebling,N.J. R5	8.45

WIRE, Tire Bead

Roebling,N.J. R5	10.80

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Bartonville,Ill.(19) K4	126
Crawfordsville M8	129
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.San.Fran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
Duluth A7	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	112
Joliet,Ill. A7	116
Minnequa,Colo. C10	121
Moline,Ill. R2	116
Williamspt,Pa. S19	120

WOVEN FENCE,9-15½Ga. Col.

Ala.City,Ala.,17-18ga.R2	198
AlabamaCity,Ala. R2	116
Aliquip.,Pa.9-14½ga. J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	119
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.,6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116
Sterling,Ill.(1) N15	116

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	116
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock To Dealers & Mfrs. (7) Col.

AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	112
Crawfordsville,Ind. M8	109
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108

RAILS

	Std. No. 1	Std. No. 2	All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.65
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	*9.10*
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.60
Pittsburgh,Pa. O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	*5.60*
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	*5.60*
Struthers,O. Y1	*5.60*
Youngstown R2	*5.60*

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.50
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.65
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	*9.10*
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.60
Pittsburgh,Pa. O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	*5.60*
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	*5.60*
Struthers,O. Y1	*5.60*
Youngstown R2	*5.60*

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New EngHighCarb. Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg.Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills.
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U4 Universal Cyclops Steel
V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstwn Sheet & Tube

(1) Chicago Base. (2) Angles. (3) Merchant. (4) Reinforcing. (5) Philadelphia del. (6) Chicago or Birm. Base. (7) To jobbers, 3 cols. lower. (8) 16 gage and heavier. (9) 6 in. and narrower. (10) Pittsburgh Base. (11) Cleveland & Pittsburgh Base. (12) Worcester, Mass. Base. (13) 3"& wider; over ⅛" to under 3" 5.15c. (14) Also wide flange beams. (15) ¼" and thinner. (16) 40 lb and under. (17) Flats only. (18) To dealers. (19) Chicago & Pittsburgh Base. (20) Deduct 0.25c for untreated. (21) New Haven, Conn. Base. (22) Del. San Fran. Bay area. (23) Angles 1"x1" to 1¼"x1¼" only. (24) Deduct 0.35c for finer than 15 Ga. (25) Up to 0.035 C; 4.40c, 0.035 C and over. (26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c. (28) Bonderized. (29) 0.26-0.40 C. (30) 0.40 C and less. (31) Not annealed. (32) Untreated. (33) To jobbers, deduct 20 cents. (34) 6.70c for cut lengths. (35) 72" and narrower. (36) 54" and narrower. (37) 15 Ga. & lighter; 60" & narrower. (38) 14 Ga. & lighter; 48" & narrower. (39) 48" and narrower. (40) Lighter than 0.035"; 4.40c, 0.035" and heavier.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	36.5	34.5	...	8.5	9	...
¼	6.0	0.42	33.5	31.5	...	9.5	11	...
⅜	6.0	0.57	29	27	...	5.5	8	...
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ per-centage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ¼" through ⅜",W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ¼" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10. Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Galv. B	Elec. Weld Black C	Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	—Elec. Weld— H.R.	C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2½	12	25.29	29.76	24.53	28.87
2¾	12	27.71	32.58	26.88	31.60
3	12	29.36	34.53	28.48	33.49
3¼	12	30.82	36.27	29.90	35.18
3½	11	35.87	42.22	34.79	40.95
4	11	38.52	45.35	37.36	43.99
4½	10	47.82	56.25	46.39	54.56
5	9	63.37	74.59	61.47	72.35
6	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10%	Both sides	—Sheets— Carbon Base 10%	20%	Copper Base Both Sides
302	....	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Dexodized. † Deduct 4.25c for hot-rolled. Production points for carbon base products: Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam. 27
- ⅝-in. & ⅝-in. 29
- ¾-in. and larger 26

Longer than 6 in.:
- All diams. 22

Lag bolts, all diams.:
- 6 in. and shorter.... 30
- over 6 in. long..... 28

Ribbed Necked Carriage. 26
Blank 40
Plow 40
Step, Elevator, Tap, and Sleigh Shoe 28
Tire bolts 20
Boiler & Fitting-Up Bolts 37

NUTS

H.P. & C.P. Reg. & Heavy Square:	Reg.	Heavy
½-in. and smaller	25	
⅝-in. & ⅝-in.	23	
¾-in.-1½-in.	23	
1⅝ in. and larger	16	
H.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅝-in..	28	25
¾-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16
C.P. Hex:		
½-in. & smaller	33	29
⅝-in. & ⅝-in..	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

½-in. and smaller	Hvy. 35	Reg. 41	Lght. 41
⅝-in. & ⅝-in.	30	36	36
¾-in.-1½ in..	27	31	33
1⅝-in.&larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 63.5 & 10
Plated finishes ... 50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ¼-in. through ⅝-in... 50
- ¾-in. through 1 in... 43

Longer than 6 in.:
- ¼-in. through ⅝-in... 33
- ¾-in. through 1 in.... 13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter 46
1 in. and smaller diam. x over 6 in. 33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller..... 41
¼-in. diam. & larger... 24
N.F. thread, all diams. . 18

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.25c
7/16-in., under .....43 off

Washers, Wrought

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb.
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge,Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk,N.Y., bars, wire A4.
Duquesne, Pa., bars C3.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4.
So. Chicago, Ind., bars & structurals C3.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 309 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 22.00
Toluol, one deg.. 19.00-24.75
Industrial xylol.. 20.50-26.50

Per ton bulk, ovens
Sulphate of ammonia..$45.00

Cents per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.50
Do., less than carlots.14.25
Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots..	15.00
Swedish, c.i.f. New York, in bags..	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron: 97.9-99.8%, size 5 to 10 microns..	70.00-135.00
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500-lb drums, freight allowed	30.00
Brass, 10-ton lots.	23.25-26.25
Copper:	
Electrolytic	27.75
Reduced	27.00
Lead	18.50
Manganese:	
Minus 100-mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh....	56.00
Nickel, unannealed	61.00-66.00
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302...	75.00
Tin	86.50
Zinc, 10-ton lots..	15.25-18.00
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb..	3.00
98.8%, minus 65 mesh, freight allowed. 1000 lb and over..	2.90
less than 1000 lb..	3.00
Molybdenum:	
99%, minus 80 to 200 mesh. over 500 lb.....	2.25
200 to 500 lb	2.60
less than 200 lb...	2.75
82-88%, freight allowed. 2000 lb and over..	2.40
less than 2000 lb..	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll,fur...$13.00-13.50
Connellsvll,fdry.. 15.00-16.00
New River, foundry...18.00
Wise county, foundry .15.35
Wise county, furnace..14.60

OVEN FOUNDRY COKE

Kearney, N. J., ovens.$22.00
Everett, Mass., ovens
New England, del.‡.22.70
Chicago, ovens 21.00
Chicago, del. .....†22.45
Detroit, del. 24.91
Terre Haute, ovens....21.20
Milwaukee, ovens 21.75
Indianapolis, ovens ...19.85
Chicago, del. 23.32
Cincinnati, del. 22.77
Detroit, del. 23.75
Ironton, O., ovens 20.40
Cincinnati, del. 22.71
Painesville, O., ovens .21.90
Buffalo, del. 24.02
Cleveland, del. 23.62
Erie, del. 22.04
Birmingham, ovens 18.70
Philadelphia, ovens ...20.45
Swedeland, Pa., ovens.20.40
Portsmouth, O., ovens.19.50
Detroit, ovens 20.65
Detroit, del. *21.70
Buffalo, del. 22.95
Flint, del. 23.00
Pontiac, del. 21.98
Saginaw, del. 23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.03 freight zone from works.

UNIVERSITY OF MICHIGAN LIBRARIES

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS				PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§	Standard Structural Shapes	Carbon	Floor
New York (city)	5.75	6.84	7.20	6.04	...	5.85	6.64	8.60	5.65	5.90	7.34
New York(c'try)	5.55	6.54	6.90	5.84	...	5.65	6.44	8.40	5.45	5.70	7.14
Boston (city) ..	5.75	6.68	7.19	5.98	...	5.80	6.50	8.70	5.75	6.08	7.28
Boston (c'try) .	5.55	6.48	6.99	5.78	...	5.60	6.30	8.50	5.55	5.88	7.08
Phila. (city) ..	6.45	6.60	6.95	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try) .	6.20	6.35	6.70	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.25	6.59	6.66	5.79	...	5.69	6.39	...	5.69	5.40	7.04
Balt. (c'try) ..	5.05	6.39	6.46	5.59	...	5.49	6.19	...	5.49	5.20	6.84
Norfolk, Va. ..	6.10	...	...	...	...	6.15	7.20	...	6.20	6.15	7.55
Wash. (w'hse).	5.46	...	...	6.00	...	5.90	6.62	...	5.90	5.61	7.25
Buffalo (del.)..	5.25	6.00	7.00	5.61	...	5.25	5.95	10.10††[5]	5.35	5.65	6.95
Buffalo (w'hse)	5.05	5.80	6.80	5.41	...	5.05	5.75	9.90††[5]	5.15	5.45	6.75
Pitts. (w'hse)..	5.05	5.80*	6.45-6.70	5.20	6.15	5.00	5.75	9.55††	5.05	5.15	6.40
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	6.03	9.86††[5]	5.44	5.59	6.68
Cleveland (del.)	5.25	6.00	7.15	5.44	6.20	5.32	5.95	8.31	5.37	5.52	6.87
Cleve. (w'hse).	5.05	5.80	6.95	5.24	6.00	5.12	5.75	8.16	5.17	5.32	6.67
Cincin. (w'hse).	5.32	5.84	6.29	5.49	...	5.39	6.10	9.90††[5]	5.44	5.59	6.75
Chicago (city) .	5.25	6.00*	6.90	5.30	...	5.20	5.85	9.75††[5]	5.25	5.40	6.60
Chicago (w'hse)	5.05	5.80*	6.70	5.10	...	5.00	5.65	9.55††[5]	5.05	5.20	6.40
Milwaukee(city)	5.39	6.14*	7.04	5.44	...	5.34	6.09	9.89††[5]	5.39	5.54	6.74
Milwau. (c'try).	5.19	5.94*	6.84	5.24	...	5.14	5.89	9.69††[5]	5.19	5.34	6.54
St. Louis (del.).	5.53	6.28	7.18	5.58	...	5.48	6.23	10.03††[5]	5.53	5.68	6.88
St. L. (w'hse).	5.38	6.13	7.03	5.43	...	5.33	6.08	9.88††[5]	5.38	5.53	6.73
Birm'ham (del.)	5.20[10]	5.95	6.30[2]	5.25[10]	...	5.15[10]	6.88	...	5.20[10]	5.35[10]	7.63[10]
Birm'hm(w'hse)	5.05[10]	5.80	6.15[2]	5.10[10]	...	5.00[10]	...	...	5.05[10]	5.20[10]	...
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	5.95	7.15	7.60	6.00	8.25	5.95	7.70	...	5.85	5.95	8.15
L. A. (w'hse).	5.80	7.00	7.45	5.85	8.10	5.80	7.55	...	5.70	5.80	8.00
San Francisco .	6.25[9]	8.60[2]	7.50[2]	6.75[9]	8.25[3]	6.15[9]	7.80[8]	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.70[7]‡	8.15[3]	...	6.90	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]
Kans. (w'hse) .	5.65	6.40	7.30	5.70	...	5.60	6.35	10.10	5.65	5.80	7.00

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; [1]—1500 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 999 lb; [8]—300 to 499 lb; [9]—400 to 3999 lb; [10]—500 to 9999 lb inclusive."

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $107; Ottawa, Ill., $106. Hard-fired, $141 at above points, except $135, Ottawa, Ill.

High-heat Duty: Salina, Pa. $91; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $30.50-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. Future increases in upper lake rail freight rates, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hemitites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-$22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$17.00-18.00
45% no ratio	18.00-18.50
48% no ratio	26.00-27.00
50% no ratio	27.00-27.50
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	28.00-29.00
48% 3:1 lump	36.00-37.00
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 125)

Metal Consumption May Slump

Metalworking operations threatened by paralyzing effects of coal shortage. Sales and prices of major nonferrous metals remain steady. Straits tin offered at 74.25c to 74.50c

New York—Threat to nonferrous metal consumption is becoming more menacing as the paralyzing effects of the coal shortage spreads Rationing of power in some districts forces curtailment of operations at metalworking plants; desire to conserve their own raw materials has resulted in revised operating schedules at a few other plants. In those plants where nonferrous metals are used in conjunction with iron and steel components, a threatened holdup in shipments of the latter will attack the metalworking plants from still another angle.

While the threat is serious, metalworking operations held at a fairly high rate last week. Within the next ten days the full impact of the coal shortage, if not corrected in the interim, will be met. Due to dislocations already suffered by the nation's economy, repercussions will be felt for many weeks ahead.

In spite of the ominous outlook, sales of major nonferrous metals remain steady and prices generally are unchanged. Tin has been erratic pricewise this month on the open market, having fluctuated from the government's selling price of 74.50c down to 74.25c.

Copper—New business booked by copper product manufacturers is holding up exceptionally well. Orders booked by brass mills this month have been maintained at the high January levels, while wire mill business is at a satisfactory rate. Buying of copper by domestic consumers for February and March deliveries indicate that shipments during those months again will exceed 100,000 tons. This would bring the number of consecutive months in which deliveries exceeded that figure to seven. The price of electrolytic copper is unchanged at 18.50c, delivered Connecticut Valley.

Reflecting the heavy flow of scrap materials, refiners and brass ingot makers have reduced their bids ¼-cent a pound on all grades to the basis of 15.25c for No. 1 copper.

Primary producers and custom smelters delivered 9868 tons of refined copper to the government for stockpiling purposes in January. This brought total stockpile deliveries since July 1, 1948, to 192,636 tons.

Lead—Severe winter weather over a wide area of the United States indicates that sales of replacement batteries will spurt. Shipments of automotive replacement batteries during January totaled 1,695,000 units compared with 1,869,000 units in December. This marked the fourth consecutive month that shipments have dropped. Buying of lead by this industry, however, coupled with those from other industries, has maintained sales at a satisfactory rate. Prices are steady at 11.80c, St. Louis.

Zinc — Galvanizers are making fresh commitments for zinc cautiously in view of the impending sharp reduction in production of zinc-coated products. Undertone of the slab zinc market holds steady, partly on the widespread belief that a rapid acceleration in consuming demand will develop as soon as coal mining is resumed. Prime western is unchanged at 9.75c, East St. Louis.

Tin—No pickup in tin buying is expected until steel mills can reverse the present downtrend in operations. Straits tin prices on the open market are still fluctuating within a narrow margin, metal for prompt delivery being available at around 74.25c compared with RFC's offering price of 74.50c. The British delegation which recently visited Washington reports that it has been unable to effect a long-term agreement for the sale of Straits tin for the United States permanent stockpile

Reopens Zinc Mine, Concentrator

New York—Illinois Zinc Co. is reopening its Kearney zinc mine in New Mexico after eight months' suspension. The company also is resuming operations at its Deming concentrator to treat ores from the Kearney property. Mining at Kearney ceased June 18, 1949, after the price of zinc had fallen from 17.50c to 9.00c a pound, East St. Louis, and after demand for zinc had dropped sharply. Employees have returned to work on the negotiated basis of a reduction in wages. The company's Pewabic zinc mine, also in New Mexico, has been closed since May of last year.

Boosts Beryllium-Copper Output

Riverside, N. J.—Riverside Metal Co. is offering beryllium-copper in wire sizes as small as 0.02-in. and rods as large as 2¼ in. in diameter. Sheet and strip is available in widths up to 8 in. and thicknesses down to 0.005 in.

Decision to revive volume production of this nonferrous material was based on new knowledge of methods for controlling the temper of beryllium-copper and maintaining those physical properties important to the practical application of the alloy.

Zinc Mine Output Drops

Washington—Domestic mine output of recoverable zinc (including that recovered as zinc pigments and salts directly from ore) fell 7 per cent in 1949 compared with 1948, and, except for 1946 when extended labor strikes paralyzed the industry, was the smallest since 1939, reports the Bureau of Mines.

The principal factor contributing to the decline in zinc yield was the sharp drop in demand and price during the first half of the year which forced a number of mines to close, some of which later reopened, and brought about reductions in the length of the work week at most other properties.

Alcoa To Roll Magnesium Sheets

Pittsburgh — Aluminum Co. of America is establishing a new division for rolling magnesium sheets at its New Kensington, Pa., Works. The division is established to meet increased demand for magnesium sheet in airplane construction and other phases of the national security program.

Magnesium rolling operations were discontinued at the New Kensington Works in 1947 because of the sharp drop in demand for that product after World War II. Sufficient orders are now assured to make possible operation on a developmental basis.

Reports on Premium Price Plan

Washington—Of the 3591 mines participating in the premium price plan, in effect in 1942-1946, over 3000 of the quotas issued went to small leasers and prospectors who operated from a month to a year and whose production was small and erratic. This is revealed in information circular 7536, issued by the Bureau of Mines.

While 13 per cent of the mines received 93 per cent of the total of $351,108,139 premiums paid during the 65-month period, Feb. 1, 1942, to June 30, 1946, few of the 470 receiving over $100,000 could be classed as large mines. Many were old properties which had been idle many years but were revived under the premium subsidies.

Liberalizes Export Controls

Washington—Office of International Trade, Department of Commerce, has removed 12 miscellaneous minerals, ores and metals from the export control "Positive List."

This action permits shipment of these commodities in any quantity and to any destination without validated export licenses: Copper ore, concentrates; nickel ore, concentrates and matte; zinc ore and concentrates; mercury; chromium or chromite ores and concentrates; manganese ores and concentrates, containing 10 per cent or more manganese; manganese metal and alloys (the latter containing 10 per cent or more manganese included); titanium, ilmenite, and rutile ores and concentrates; fluorspar, all grades; kyanite and allied materials, crude, ground, or calcined; battery shells and parts, unassembled; insulating material, not elsewhere specified (except porcelain, glass and rubber).

Exports of automobiles, replacement parts, accessories, and service equipment, valued at $500 or more, require validated export licenses. Formerly the dollar-value limit was $100.

Applicants for licenses to export chemicals containing lead will no longer be required to submit a statement indicating the lead content of the chemicals covered by the license application.

UNIVERSITY OF MICHIGAN LIBRARIES

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 18.50c, Conn. Valley, Lake, 18.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 16.75-18.25c; 88-10-2 (No. 215) 25.25c; 80-10-10 (No. 305) 21.75c; No. 1 yellow (No. 405) 14.25-16.00c.

Zinc: Prime western 9.75c, brass special 10.00c, intermediate 10.25c, East St. Louis; high grade 10.85c, delivered.

Lead: Common, 11.80c; chemical, 11.90c; corroding, 11.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.50-16.75c; No. 12 foundry alloy (No. 2 grade) 16.00-16.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.75-18.00c; grade 2, 17.25-17.50c; grade 3, 15.75-16.00c; grade 4, 15.25-15.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt del., 74.25c; February del. 74.25c; March del. 74.25c; April del. 74.25c; May del. 74.25c. Chinese 99% tin, prompt del., nominal.

RFC selling prices for prompt delivery, ex-dock New York or f.o.b. Texas City, Tex.: Grade A, 99.8% or higher (including Straits) 74.50c.

Antimony: American 99-99.8% and over but not meeting specifications below 27.25c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 27.75c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese, 24.00c; English, Belgium, prompt, 25.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $71-$74 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 73.25c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

Sheet: Copper 32.18; yellow brass 28.69; commercial bronze, 95%, 32.10; 90%, 31.61; red brass, 85%, 30.60; 80%, 30.12; best quality, 29.58; nickel silver, 18%, 42.27; phosphor-bronze, grade A, 5% 50.90.

Rods: Copper, hot-rolled 28.03; cold-drawn 29.28; yellow brass free cutting, 23.19; commercial bronze, 95% 31.79; 90% 31.30; red brass 85% 30.29; 80% 29.81.

Seamless Tubing: Copper 32.22; yellow brass 31.70; commercial bronze 90% 34.27; red brass 85% 33.51; 80% 33.03.

Wire: Yellow brass 28.98; commercial bronze, 95% 32.39; 90% 31.90; red brass, 85% 30.89; 80% 30.41; best quality brass 29.87.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 22.55, l.c.l. 23.17, c.l. 22.67; weatherproof, f.o.b. eastern mills, 100,000 lb lots 24.85, l.c.l. 25.60, c.l. 25.10; magnet, delivered, c.l. 28.50, 15,000 lb or more 28.75, l.c.l. 29.25.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	36.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List price plus 45%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled, 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Feb. 21-23	18.50	11.80	9.75	74.25	17.00	27.25	40.00	73.25
Feb. 20	18.50	11.80	9.75	74.37½	17.00	27.25	40.00	73.25
Feb. 14-18	18.50	11.80	9.75	74.50	17.00	27.25	40.00	73.25
Feb. 10-11	18.50	11.80	9.75	74.375	17.00	27.25	40.00	73.25
Feb. 7-9	18.50	11.80	9.75	74.50	17.00	27.25	40.00	73.25
Feb. 2-6	18.50	11.80	9.75	74.375	17.00	27.25	40.00	73.25
Feb. 1	18.50	11.80	9.75	74.25	17.00	28.75	40.00	73.25
Jan. Avg.	18.50	11.80	9.81	76.02	17.00	29.92	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84cc; oval 28.34c; cast 26.87c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.50c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.75c; over 250 lb, 24.75c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbls, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 91.00c, 500 to 999 lb, 91.5c; 200 to 499 lb, 92.00c; less than 200 lb, 93.5c; ball, 1000 lb and over, 93.25c; 500 to 999 lb, 93.75c; 200 to 499 lb 94.25c; less than 200 lb, 95.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 58.2c; 100 or 300 lb drums only, 100 to 500 lb, 49.9c; 600 to 1900 lb, 47.6c; 2000 to 9900 lb, 45.8c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c, f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 84.50c; more than 2000 lb, 82.50c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 70.80c; 100 lb kegs 71.80c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%	14.50	14.25	7.25
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze	12.00	11.75	11.12½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; composition red brass 12.50; radiators 10.00; heavy yellow brass 9.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; refinery brass (60% copper) per dry copper content 13.50-13.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 13.50-13.75, No. 2 12.50-12.75; light copper 11.50-11.75; No. 1 composition red brass 11.00-11.25; No. 1 composition turnings 10.25-10.50; mixed brass turnings 6.25-6.50; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.00-6.25; heavy yellow brass 7.25-7.50; new brass rod ends 9.75-10.00, auto radiators, unsweated 8.50-8.75; cocks and faucets, 8.50-8.75; brass pipe 9.00-9.25.

Lead: Heavy 9.25-9.50, battery plates 4.25-4.50; linotype and stereotype 10.00-10.25; electrotype 9.00-9.25; mixed babbitt 9.25-9.50.

Zinc: Old zinc 4.25-4.75; new die cast scrap 4.00-4.50; old die cast scrap 3.00-3.25.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00, No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 10.50-11.00; old sheets 7.50-8.00, crankcase 7.50-8.00, borings and turnings 3.00-3.50.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Feb. 23, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Feb. 23	$27.67
Feb. 16	27.67
Jan. 1950	26.39
Feb. 1949	38.48
Feb. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania

PITTSBURGH

No. 1 Heavy Melt.	$32.00
No. 2 Heavy Melt.	29.00
No. 1 Busheling	32.00
No. 1 Bundles	32.00
No. 2 Bundles	24.00-25.00*
No. 3 Bundles	23.00-24.00*
Heavy Turnings	26.00-27.00
Machine Shop Turnings	21.50-22.00†
Mixed Borings, Turnings	21.50-22.00†
Short Shovel Turnings	*25.00*
Cast Iron Borings	24.00-25.00
Low Phos. Steel	32.00-33.00*

Cast Iron Grades*

No. 1 Cupola Cast	34.00-35.00
No. 1 Machinery Cast	38.00-39.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	29.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.50-33.00
Axles	35.00-36.00
Rails, Random Lengths	35.50-36.00
Rails, 2 ft. and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	34.00-35.00
Angles, Splice Bars	32.00-33.50*

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$28.00-28.50
No. 2 Heavy Melt. Steel	25.50-26.00
No. 1 Busheling	28.00-28.50
No. 1 Bundles	28.00-28.50
No. 2 Bundles	22.00-22.50
Machine Shop Turnings	18.00-18.50
Mixed Borings, Turnings	21.00-21.50
Short Shovel Turnings	21.00-21.50
Cast Iron Borings	21.00-21.50
Low Phos.	29.00-29.50
Cut Structurals	31.00-31.50

Cast Iron Grades

No. 1 Cupola	41.50-42.00
Charging Box Cast	38.00-39.00
Stove Plate	35.50-36.50
Heavy Breakable Cast	31.00-31.50
Unstripped Motor Blocks	31.00-32.00
Brake Shoes	28.50-29.50
Clean Auto Cast	42.00-43.00
No. 1 Wheels	36.50-37.00
Burnt Cast	31.50-32.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.50-33.00
R.R. Malleable	38.50-39.00
Rails, 3 ft and under	41.00-42.00
Rails, 18 in. and under	43.00-44.00
Rails, Random Lengths	38.00-39.00
Cast Steel	34.00-35.00
Railroad Specialties	35.00-35.50
Uncut Tires	36.00-37.00
Angles, Splice Bars	39.50-40.50

VALLEY

No. 1 Heavy Melt Steel	*$31.50-32.00*
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Bundles	*31.50-32.00*
No. 2 Bundles	24.50-25.50
Machine Shop Turnings	21.50-22.50
Short Shovel Turnings	23.50-24.00
Cast Iron Borings	23.50-24.00
Low Phos.	32.50-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-33.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$23.50
No. 2 Heavy Melt. Steel	21.50
No. 1 Busheling	21.50
No. 1 Bundles	23.50
No. 2 Bundles	18.00-18.50
Machine Shop Turnings	*15.50*
Short Shovel Turnings	17.50
Mixed Borings, Turnings	15.00-15.50
Bar Crop and Plate	25.50-26.00
Punchings & Plate Scrap	25.50-26.00
Cut Structurals	25.00-26.00
Elec. Furnace Bundles	24.50
Heavy Turnings	23.50
No. 1 Chemical Borings	29.00
Knuckles and Couplers	*29.00-30.00*
Steel car wheels	*29.00-30.00*

Cast Iron Grades

No. 1 Cupola Cast	30.00
No. 1 Machinery Cast	36.00-37.00
Charging Box Cast	*32.00-33.00*
Heavy Breakable Cast	*32.00-34.00*
Unstripped Motor Blocks	*25.00*
Clean Auto Cast	36.00-37.00
No. 1 Wheels	37.00
Malleable	38.00

CINCINNATI

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	23.00
No. 1 Busheling	26.00
No. 1 Bundles	26.00
No. 2 Bundles	20.00
Machine Shop Turnings	13.00
Short Shovel Turnings	16.00
Mixed Borings, Turnings	16.00
Cast Iron Borings	16.00

Cast Iron Grades

No. 1 Cupola Cast	38.00
Charging Box Cast	32.00
Heavy Breakable Cast	32.00
Stove Plate	30.00
Unstripped Motor Blocks	22.00
Brake Shoes	22.00
Clean Auto Cast	38.00
Drop Broken Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00
R.R. Malleable	33.00
Rails, Rerolling	34.00
Rails, Random Lengths	33.00
Rails, 18 in. and under	42.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$21.00-22.00
No. 1 Bundles	23.00-24.00
No. 2 Bundles	20.00-21.00
No. 1 Busheling	23.00-24.00
Machine Shop Turnings	12.00-13.00
Mixed Borings, Turnings	12.00-13.00
Short Shovel Turnings	14.00-15.00
Cast Iron Borings	16.00-17.00
Punchings & Plate Scrap	23.00-24.00

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Heavy Breakable Cast	29.00-30.00
Clean Auto Cast	35.00-36.00

BUFFALO

No. 1 Heavy Melt. Steel	$28.00-28.50
No. 2 Heavy Melt. Steel	25.50-26.00
No. 1 Bushelings	25.50-26.00
No. 1 Bundles	26.50-27.00
No. 2 Bundles	24.00-24.50
Machine Shop Turnings	18.00-18.50
Mixed Borings, Turnings	19.00-19.50
Cast Iron Borings	19.00-19.50
Short Shovelings	19.50-20.00
Low Phos.	29.00-29.50

Cast Iron Grades

No. 1 Machinery	35.00-36.00
No. 1 Cupola	*30.50-31.50*
Malleable	31.00-32.00

Railroad Scrap

Rails, 2 ft. and under	38.00-39.00
Scrap rails	35.00-35.50
Specialties	33.00-34.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$20.50-21.00*
No. 2 Heavy Melt. Steel	17.50-18.00
No. 1 Busheling	17.50-18.00
No. 1 Bundles	20.25-20.75
No. 2 Bundles	16.00
Machine Shop Turnings	10.50-11.00
Mixed Borings, Turnings	10.50-11.00
Short Shovel Turnings	10.50-11.00
Punchings & Plate Scrap	19.50-20.00
Cut Structurals	19.50-20.00
Elec. Furnace Bundles	19.50-20.00

Cast Iron Grades

No. 1 Cupola Cast	*25.00-25.50*
No. 1 Machinery	26.00-27.00
Charging Box Cast	*25.00-25.50*
Heavy Breakable	*25.00-25.50*
Unstripped Motor Blocks	20.00-21.00
Malleable	34.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$19.00-20.00
No. 2 Heavy Melt. Steel	16.00
No. 1 Bundles	19.00-20.00
No. 1 Busheling	16.00-16.50
Machine Shop Turnings	10.00-10.50
Mixed Borings, Turnings	10.00-10.50
Short Shovel Turnings	13.00-13.50
Bar Crops and Plate	21.00-22.00
Punchings & Plate Scrap	21.00-22.00
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	27.50-30.50
Mixed Cast	21.00-22.00
Heavy Breakable Cast	24.50-25.50
Stove Plate	21.50-22.50
Unstripped Motor Blocks	17.50-18.50

CHICAGO

No. 1 Heavy Melt. Steel	$27.00-28.00
No. 2 Heavy Melt. Steel	25.50-26.50
No. 1 Bundles	27.00-28.00
No. 2 Bundles	*24.00*
Machine Shop Turnings	*19.00-20.00*
Mixed Borings, Turnings	*19.00-20.00*
Short Shovel Turnings	20.00-21.00
Cast Iron Borings	*19.00-20.00*
Low Phos.	30.50-31.50
Elec. Furnace Bundles	27.00-28.00
Heavy Turnings	23.00-24.00
Cut Structurals	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	*40.50-41.50*
Clean Auto Cast	41.50-42.50
No. 1 Wheels	33.00-34.00
Stove Plate	*31.50-32.50*

Railroad Scrap

No. 1 R.R. Heavy Melt	*29.00-30.00*
Malleable	35.00-36.00
Rails, Rerolling	40.00-41.00
Rails, Random Lengths	*33.00-34.00*
Rails, 2 ft and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	30.00-31.00
Angles, Splice Bars	34.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$23.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	19.00
No. 2 Bundles	20.00
Machine Shop Turnings	22.50
Mixed Borings, Turnings	17.00
Short Shovel Turnings	23.00
Cast Iron Borings	19.00
Bar Crops and Plate	27.00-28.00
Cut Structurals	27.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00
Stove Plate	30.00
No. 1 Wheels	nominal

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-26.00
R.R. Malleable	nominal
Rails, Rerolling	33.00-35.00
Rails, 3 ft and under	nominal
Angles and Splice Bars	nominal

ST. LOUIS

No. 1 Heavy Melt. Steel	$28.00-29.00
No. 2 Heavy Melt. Steel	24.00-25.00
Machine Shop Turnings	14.00-15.00
Short Shovel Turnings	18.00-19.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Charging Box Cast	29.00-30.00
Heavy Breakable Cast	28.00-29.00
Brake Shoes	27.00-28.00
Clean Auto Cast	36.00-38.00
Burnt Cast	27.00-28.00

Railroad Scrap

R.R. Malleable	31.00-33.00
Rails, Rerolling	36.00-37.00
Rails, Random Lengths	30.00-31.00
Rails, 3 ft. and under	35.00-36.00
Uneut Tires	27.00-28.00
Angles, Splice Bars	32.00-33.00
Railroad Specialties	30.00-31.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-32.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50
Cut Structurals	27.50

Cast Iron Grades

No. 1 Cupola Cast	*25.00-27.50*
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	18.00
Malleable	25.00
Brake Shoes	20.00
Clean Auto Cast	27.50
No. 1 Wheels	27.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	9.00
Mixed Borings, Turnings	9.00
Punchings & Plate Scrap	*26.00*

Cast Iron Grades

No. 1 Cupola Cast	*30.00-33.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00
Rails, Rerolling	31.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$24.00
No. 1 Bundles	24.00
Mechanical Bundles	22.00
Mixed Steel Scrap	20.00
Mixed Borings, Turnings	18.00
Rails, Remelting	24.00
Rails, Rerolling	27.00
Busheling	18.00
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b. shipping point.

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Unit costs were way out of line and rejects were piling up on the floor when this water cooler part was made from sheet. Seven operations were required on each part. Silver soldering of finished units was practically impossible because the fabricated material would not satisfactorily withstand high temperatures.

Now, water cooler parts are fabricated in one reverse bending operation from Type 304 Carpenter Stainless Tubing. Six operations, ranging from the slitting of sheet to the annealing of fabricated parts, have been eliminated and the soldering of assemblies is a snap.

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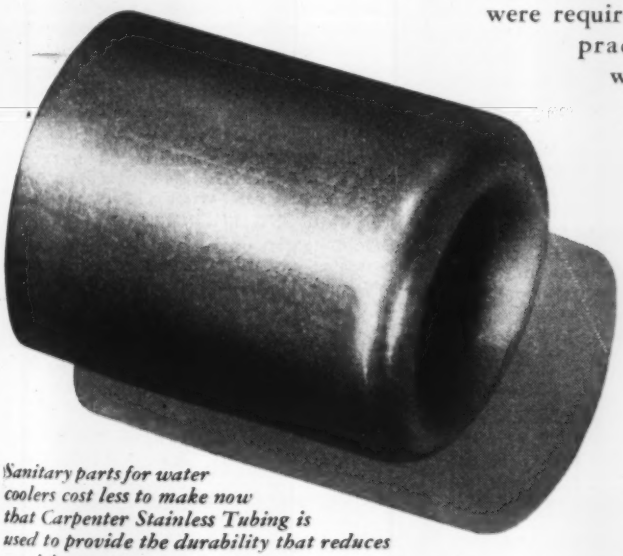

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STAINLESS TUBING

"MORE THAN CORROSION RESISTANCE"

Sheets Strip . . .

Cold-rolled strip extras raised an average of 40 cents a ton by American Steel & Wire

Sheet and Strip Prices, Page 105 & 106

Pittsburgh — Upward revision in cold-rolled strip extras, equivalent to 40 cents a ton on weighted tonnage basis, was initiated by American Steel & Wire Co. Feb. 24.

New quantity extras for low carbon cold-rolled strip have been made to coincide with untempered and tempered spring steel, and represent an advance from $5 per ton in the quantity bracket range of 2000 to 5999 lb to substantially more in small tonnage brackets.

Copper finish extras were increased $2 per ton.

An extra is now charged for No. 4 edge as follows: Widths over ½-in. to less than 1 in., $1 per 100 pounds; widths 1 to 5 in., inclusive, 50 cents; widths under ½-in. are classified as flat wire.

Special killed steel extra is now 45 cents per 100 pounds; previously it was 15 to 35 cents, depending on gage.

The former extra of 25 cents for each 0.001-in. or fraction thereof closer than the total of the standard thickness tolerance, plus or minus, has been revised as: Not more restricted than 75 per cent, 50 cents; not more restricted than 50 per cent, $1. Extra for less than 50 per cent of standard tolerance is available on application.

The extras for No. 3 edge for ⅜-in. to under 1 in. of 50 cents and $1 per 100 pounds have been eliminated on untempered spring steel. Table of ranges and limits for chemical composition on low carbon strip has been revised to agree with present AISI standards.

Carnegie-Illinois Steel Corp. reduced armature and electrical silicon steel grades $5 per ton, effective Feb. 15. This action is in line with current quotations of Republic, Armco and Inland. Other interests have not yet followed. Base prices for T-90 and T-80 also reduced to $13.20 and $14.20 per 100 pounds, respectively.

New York—Sheet consumers are beginning to experience some delay in shipments because of the coal tie up; they expect further difficulty before the mine dispute becomes settled. To date deferments have not been too heavy and some buyers say that not all delays can be directly chargeable to the fuel situation; they have been having difficulties for some time getting tonnage on schedule.

Boston—Further revision of second quarter flat-rolled steel allocations is contemplated because of semifinished steel production losses. Carryovers will be heavier and overall distribution of carbon sheets will continue to be keyed to allotments of automobile and tin plate producers. While there is some slackening in new orders, pressure for tonnage against earlier buying is strong.

Philadelphia—Supply of sheets tightens. Mills generally are far behind on current commitments and, for practical purposes, are out of the market on new tonnage.

Cleveland — Supply conditions in the light, flat-rolled products are noticeably tighter. Consumers are specifying actively, seeking to build inventories against possible severe curtailment in rolling mill schedules because of the coal situation. But the producers cannot increase shipments. In fact, they are falling further behind on deliveries. Rolling schedules are increasingly erratic, being interrupted by growing stringency in semifinished steel supply.

Chicago—"Touchy" is the word for many consumers of flat-rolled products. They have been on short sheet rations so long they have lost patience with suppliers. This attitude is particularly evident with steel operations being curtailed.

Specifying has been complete against mill quotas and, where quotas are not in force, a limiting factor exists in the allotments given to district sales managers.

Local mills' customers that supply Chrysler are still taking their full share of steel. The struck auto builder is warehousing all the steel it receives from Chicago.

Enameling iron and tin plate supply here is pinched and one washing machine maker faces production cutbacks soon.

Cincinnati—District sheet mills are maintaining full schedules, but they are eating into coal and coke reserves. Allocation of tonnage for second quarter points to continued tight supply into second half. Mills are under heavy pressure for shipments as automotive and household equipment markets for steel are tending upward.

Birmingham—Due to developments resulting from the coal shortage, demand for sheets, already strong, has increased considerably. Production is at capacity, but it is difficult to keep abreast of the market. Strip is in moderately good demand.

St. Louis—Second quarter orders for sheets are coming in at an increasing rate, reflecting high normal demand plus coal-fright attempts to stockpile. Sheet distribution continues on allocation.

Los Angeles—Delivery schedules on cold-rolled strip are extended as supplies of eastern hot-rolled strip dwindle. Delivery in some instances is not promised until June. Demand for sheets continues strong.

San Francisco—Calls for galvanized sheets are beginning to ease. Galvanized sheets are being shipped here in increasing quantities by eastern mills, and local production also has been stepped up. Cold-rolled and heavy-gage hot-rolled sheets continue in short supply.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 105

Los Angeles—Requirements for reinforcing bars are steady, but at a moderate tempo with public construction sustaining the market. Some fabricators look for increased activity after Mar. 15.

Seattle—Rolling mills are operating about 40 per cent capacity. Prospects for an acitve season in reinforcing bar market are bright as estimating forces are extremely busy figuring proposed construction, particularly apartment house projects here and in Alaska.

Steel Bars . . .

Bar Prices, Page 105

New York—Hot carbon bar shipments are being adversely affected by curtailed mill operations at several points. This curtailment may get worse before the coal situation improves. Consumers can still place orders within four to six weeks, or at least obtain tentative promises of such deliveries from regular sources which have not as yet been hard hit by the mine tie-up.

Pittsburgh—Sharp curtailment in steelmaking operations had not seriously affected bar mill rolling schedules by the close of last week. However, output at Jones & Laughlin Steel Corp., Crucible Steel Co. and other plants will be reduced drastically this week. Carnegie-Illinois Steel Corp. is scheduled to initiate first production curtailments, equal to about 25 per cent, about Mar. 1.

Chrysler Corp. has begun to hold up shipments on alloy tonnage commitments, but this loss is more than offset by increased demand from customers seeking to augment stocks.

Boston — Hot-rolled carbon bar schedules are more extended with some mills now accepting only May tonnage. Part of this increase is from warehouses. This mild spurt in hot-rolled may be anticipatory, there being no signs of an increase in consumption or in users' backlogs. Cold-finished bars have not registered similar gains although some mills are now in April on delivery of more sizes.

Philadelphia—Situation in bars is mixed. Shipments are offered by some producers within four to six weeks; others, still further.

Cold-drawn carbon bars can be had from eastern mills in some sizes from stock; within three to four weeks for turned bars and six to eight weeks for ground stock when not available from stock. Small wire sizes, ranging from ¼-in. to ½-in., can be had usually within three to four weeks.

Cleveland—Carbon bars are moving more actively than cold-finished and alloy material. Threat of further tightening in supplies because of production curtailments due to coal shortage, and expanding manufacturing requirements have combined to enliven the merchant bar market. Pressure for shipments is noticeably stronger. This is only partly due to consumers' desire to get in tonnage before the mills are forced to curtail operations. A good part of it stems from increasing activity in various lines. Agricultural implement makers' requirements are heavier. Road equipment builders are specifying more actively. Forge shops are pressing for tonnage. These latter have not yet been able to replenish bar and billet stocks depleted in last fall's steel strike.

Chicago—Farm implement, automotive and heavy construction machinery builders press for bar mill products. Railroad equipment manufacturers also show more interest in securing places on mill books. Large size shafting business is drifting, but good demand is noted for medium and small size material.

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Special Analysis Wire, Setting New Standards of Performance

Structural Shapes . . .

Structural Shape Prices, Page 105

New York—Structural awards lag. But there is a steady accumulation of inquiry. Some important work in the prospective stage is expected active later in the year, including considerable work for the proposed New Jersey turnpike and important road work for the city of New York. Fabricators believe by mid-spring they will be actively engaged.

Boston—Bridge inquiry is maintained by the Massachusetts highway program while current contracts include 2200 tons, addition for a Boston department store. Active unplaced bridge volume approximates 3500 tons with the first 1950 Connecticut bridge estimates to come out in March. Competition for structural work is sharp, tending to hold prices down. Plain material deliveries are three to four weeks on standard structurals. Foreign material is offered substantially under domestic steel.

Philadelphia—Improvement in structural demand continues. Orders are spotty, but inquiries are more numerous and larger. Public works is prominent but some sizable apartment construction is in prospect. One apartment, 33 stories, for erection on Rittenhouse Square, will require an estimated 8000 tons.

Pittsburgh—Demand for structural shapes and plates, notably from railroad carbuilders, has improved. Heavy demand for plates is indicated throughout rest of this year for large diameter line pipe construction.

Cleveland — Substantial structural demand is shaping up for this spring and summer. Numerous public jobs, including schools and hospitals, at many points throughout Ohio will be coming out for bids shortly. Industrial construction outlook is not so promising though several small and medium sized jobs are reported.

Chicago — Generally satisfactory supply situation exists for standard structurals. One mill is able to take a limited tonnage for March delivery, earlier by at least one and possibly two months than the promises from other producers. None find it necessary to limit either customers or tonnage. Wide flange material is the exception, being produced by only one mill here and many projects require it. Bidding on new inquiries continues spirited, resulting in a downward price trend.

San Francisco—Foreign structurals are being offered at about $1 a ton under West Coast mill prices. Competition for business is keen; large orders are lacking.

Rails, Cars . . .

Track Material Prices, Page 107

Birmingham — Seaboard Air Line Railroad placed an order with the Bessemer plant of Pullman-Standard Car Mfg. Co. for 300 phosphate cars. Delivery is for May and June.

Walla Walla—U. S. Engineer has awarded to Colorado Fuel & Iron Corp., Denver, contract for 10,640 net tons of rails and about 2000 tons of joint bars, tie plates, bolts and spikes for two railroad relocation jobs in connection with McNary dam.

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Plates . . .

Plate Prices, Page 105

New York—Little improvement is noted in plate demand. Most eastern mills have been able to build little in the way of backlogs and can make deliveries in three weeks; sooner if necessary. Pittsburgh mills, which normally compete here, are booked ahead more extensively. This is due in part to a more active demand in the Midwest and also, in some instances, to the fact they are not receiving sufficient steel to keep plate rolling capacity fully engaged.

Boston—Large diameter steel pipe inquiry features plate demand, this being about the only fabrication category showing an upward trend. Most of this is for 36-in. material for water line installations. Plate buying in other directions is spotty.

Philadelphia — Some district plate mills detect a slight pick-up in tonnage. Deliveries are easy. Consumers meet no difficulty in obtaining tonnage in three weeks from mills in this immediate area. Shipments from inland mills are more extended, due to the more active buying in Midwest. Line pipe work accounts for a substantial portion of Midwestern tonnage. Locally there is little or no work of this character. Prospects are dimmed by decision of one oil company here to join another firm in organization of a line pipe company with headquarters in St. Louis. This will result in taking away certain requirements which otherwise might be placed here.

Birmingham—While production of plates has been unable to keep pace with demand for several years, the situation has worsened lately.

Tubular Goods . . .

Tubular Goods Prices, Page 108

Boston—Some distributors of merchant steel pipe are taking full allocations and some are not, but the trend toward April delivery is gaining. Pressure for pipe against old orders is heavier than current buying. Volume with distributors is inclined to lag.

Los Angeles—Demand for pipe shows new vigor with increased activity in all sizes. Pipe now is one of the tightest of all Kaiser Steel Corp.'s products with Fontana's pipe books filled through March.

Tin Plate . . .

Tin Plate Prices, Page 106

Pittsburgh—Tin plate production schedules are expected to be affected adversely by restrictions placed on power consumption and forced curtailment in finishing mill schedules indicated for most producers this week as a result of the fuel shortage. Mill warehouse stocks of tin plate should materially ease any short-term loss in output. However, tin plate has been in relatively short supply since termination of the steel strike. Customers have not been able to build up stocks to the pre-strike level. This stock replenishment movement is another factor in the sold-out position of most producers through the second quarter.

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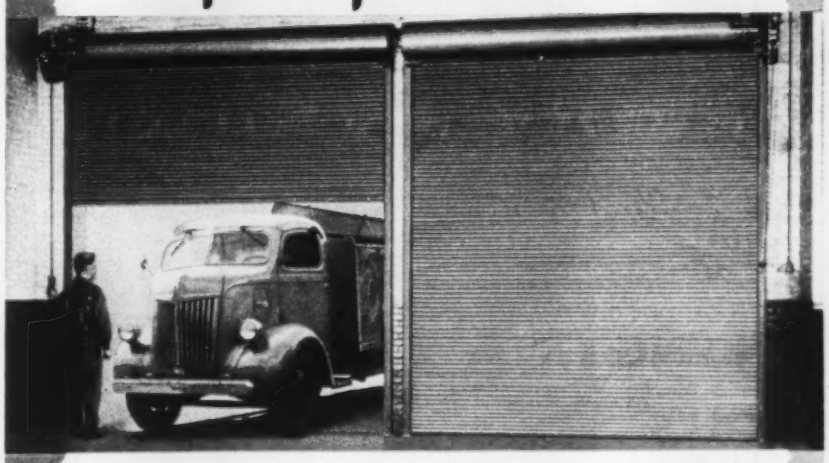

Like the smooth, rolling action of the wheel, the coiling upward action of Kinnear Rolling Doors involves a basis principle of highest operating efficiency. You can change the wheel's "face" in hundreds of ways, but you can't find a better way to do its job. By the same token, the basic advantages of Kinnear Rolling Doors give you the best answer to door needs.

Kinnear's rugged curtain of interlocking metal slats opens straight upward. It coils compactly out of the way above the opening. Floor, wall and even ceiling space remain fully usable at all times. The door clears the opening from jamb to jamb, and from floor to lintel, completely out of traffic's way. When open, it is safe from damage by wind or vehicles. When closed, it presents an all-metal barrier that assures extra protection against storms, intruders, or fire.

In addition, Kinnear Rolling Doors provide smooth, easy operation under all conditions. They may be controlled manually, mechanically (by chain or crank) or electrically. Motor operated doors can be equipped with any number of remote control switches, for highest convenience. Kinnear Rolling Doors are built of various metals, in any size, for easy installation in old or new buildings. Let us send you complete information.

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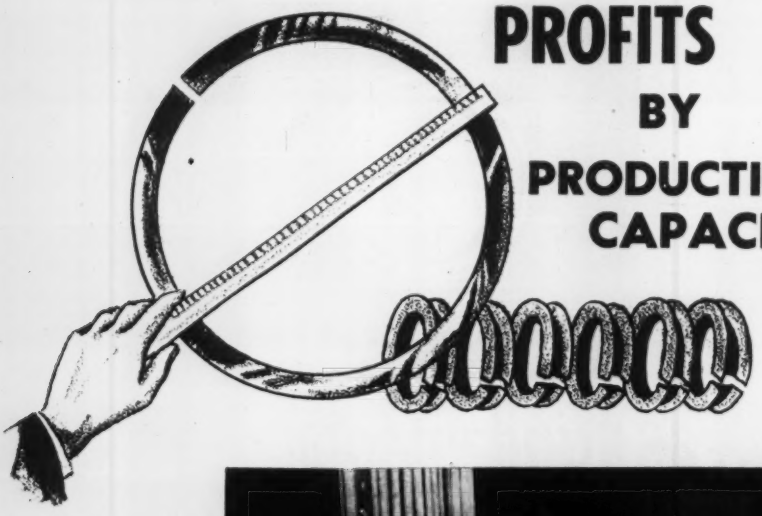

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2. Angles, leg-in
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4. Channels, flanges-out
5. Flats on edge
6. Flats on flat
7. Rounds
8. Squares
9. Copper tubes, 12 gauge
10. Copper tubes, 17 gauge
11. Standard St. pipe
12. X heavy pipe
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And many other special sections.

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Wire . . .

Wire Prices, Page 107

Boston—While there are openings in schedules beyond April on some grades of low carbon wire, the mills generally are sold out through that month. Cold heading wire deliveries are further extended into May, and while buying of furniture spring wire is mostly on a monthly basis, March tonnage slightly tops that of the previous month.

Los Angeles—Wire market is quiet, with little recovery yet apparent from the seasonal lows of January and February. Current strike at Chrysler puts that company out of the wire market.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 108

New York—Bolt and nut demand is increasing, as jobbers fill in stocks and new price schedules gain acceptance. It also reflects a pickup in structural requirements. Eastern producers generally are operating on a 40-hour schedule and have backlogs equivalent to about four weeks' output. Offerings of bolts and nuts from Japan are being made at prices considerably under domestic levels.

Pittsburgh — Output of fasteners should continue relatively unchanged this week, despite indicated reduction in deliveries of steel from mills. Inventories of steel are below normal and there is a further threat of additional cuts in power consumption for industrial and commercial applications.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 108

Philadelphia—While prices have advanced on oven coke in some districts, they remain unchanged along eastern seaboard. Action, if any, probably will be deferred until after the coal situation clarifies.

Pittsburgh — Demand for foundry coke is not as active as that for other raw materials. Relatively low level operations among jobbing foundries, plus heavy shipments of oven foundry coke from producers in the East and other areas outside this district, have offset cessation of production among Connellsville beehive interests and restricted output among district oven coke producers.

Cleveland—Threatened further curtailment of oven coke production due to coal shortage is stimulating some covering of coke requirements. To date oven operators have been able to care for customers' requirements promptly, but with coal stocks shrinking rapidly, the time is fast approaching when it may be necessary to restrict individual shipments.

Chicago—Coke producers depending on rail coal are biting deeply into stockpiles. Those whose supply was laid down from boats before the navigation season ended are adequately supplied. Foundries in the Milwaukee area and some in Chicago, therefore, are not too much troubled over the strike except as it may have an effect on future prices. Independent mines are helping prolong operations of some consumers here.

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Warehouse . . .

Warehouse Prices, Page 109

Pittsburgh—Steel distributors expect full impact of the indicated reduction in mill shipments this week. Warehouse stocks, excluding sheets, strip and wide flange beams, are believed ample to tide distributors over a relatively short period of restricted finished steel output. Demand has not yet recorded the sharp upturn normally preceding a serious threat to primary and finished steel production schedules.

Philadelphia — District warehouses report larger daily average tonnage than in January. Uncertain outlook in coal has stimulated demand. Sheets are the most stringent item.

Cleveland—Encouraging pickup in ordering is reported by warehouses here. Sheets are in extremely active demand and are in short supply. Carbon bars also are moving in larger volume. Alloys, however, continue sluggish. Some of the improved demand is attributed to protective covering with the steel mills curtailing operations because of coal shortage. At the same time, current requirements of manufacturing industry are expanding in various directions. Several distributors think strong demand will be experienced over the remainder of the year with steel supply tight in the major classifications.

Chicago—Theory that warehouses can fill the gap, if finished steel production is significantly curtailed by lack of coal, is laughed at by distributors. They receive identical cuts in receipts when consumers do and have fared no better than the average metalworking plant in replenishing sheet stocks. Pressure on them intensifies as mill curtailments near.

A significant rise in activity is noted in the gray market in view of the definite restrictions on the amount of material which can be supplied by warehouses. Customers are more complacent about bars and shapes, and business in these, while steady, is not of exceptional size.

Cincinnati—Warehouse sales volume is good even though buying for coal mines has faded. Seasonal inquiries for building steel are appearing. Scarcity of sheets is pronounced.

Los Angeles—Distributors report the best business in weeks as demand continues to move upward. Virtually all categories are more active. Distributors are buying carefully to avoid paying large extras. Overall volume of distributor purchases is increasing.

San Francisco — Although buying at the warehouse level is slightly better, the upturn has not been enough to bring volume up to normal. Competition is keen with distributors shading prices on most products.

Seattle — Improved weather has stimulated warehouse buying and volume of sales is noticeably higher than last month. New business has been taken by sheet metal shops and warehouse items have been moving in larger volume. Machine shop operations also have improved. Outdoor construction has added to the better tone of the warehouse trade. Sheets continue scarce and buyers look for allocations. Mills had not filled their backlogs, following the fall strike, when the present coal crisis arose.

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by Horsburgh & Scott

● Here's why Horsburgh & Scott Herringbone gears are quiet and smooth running at all speeds . . . 1. Sykes type where two or more teeth are always in contact. 2. Teeth accurately generated on finest gear cutting machines with correct amount of backlash. 3. End thrust entirely eliminated. 4. Pitch line absolutely concentric with bore. 5. Rims, arms and hub extra heavy for pitch of gear. It will pay you to try these superb gears.

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Pig Iron . . .

Pig Iron Prices, Page 104

Boston—Some sellers are not taking orders until coal supply is replenished but no serious shortage confronts foundry grade users in the near future with the Mystic furnace operating and reinforced with large reserve stocks.

New York—District foundries have put little pressure on pig iron sellers, partly because they are not being pressed and also because they have fair inventories. Jobbing foundries are operating no more than four days a week

Pittsburgh—Decline in pig iron output is greater than indicated by the ratio of 28 out of 47 stacks operating last weekend. A number of furnaces are under slack wind, resulting in yield cuts up to 50 per cent. Additional reduction in production is scheduled this week, unless coal mining is resumed. The lone merchant foundry iron producer here has curtailed output nearly 50 per cent. Pressure for additional iron from enamelware and large captive foundries is unusually heavy. Producers' iron stocks are nearly depleted.

Philadelphia—Pig iron production has been restricted by the coal shortage, but shipments of merchant iron are adequate. This is accounted for in part by the AFL strike, now in its eighth week, in a number of foundries here.

Cleveland—Two out of nine blast furnaces in this area have been banked and additional suspensions loom immediately ahead unless the coal strike ends quickly.

Merchant iron demand is a little more pressing. Some foundries are specifying more actively against contracts. New business, however, is not particularly stimulated by threat of tighter supplies.

Foundries are averaging between 55 and 60 per cent of capacity operations.

Buffalo—Pig iron production has dropped sharply as a result of the coal pinch. On the basis of number of furnaces still active, output is down to 69 per cent of capacity. Actually, operations are considerably lower as the wind is reduced drastically on many of the active units.

Chicago—Operations at some blast furnaces are on a day-to-day basis. Wind has been reduced as a safety measure and decision to bank may be made at any moment. Late in the week, 31 of the district's 42 stacks were operating. Youngstown Sheet & Tube Co. had taken off its No. 5 unit at South Works Feb. 19, Inland Steel Co.'s B furnace went down Monday. On the previous Friday, Carnegie-Illinois Steel Corp. blew out its No. 3 stack at Gary for repairs, replacing it with No. 11 which had previously been down. Inland has served notice one of its remaining three stacks may have to be banked momentarily.

Birmingham—With two merchant furnaces off—Sloss-Sheffield Steel & Iron Co. in North Birmingham—tightness in the pig iron supplies increases. Even with slowed foundry output—notably cast iron pipe—the district is unable to meet pig iron requirements fully.

St. Louis—Pig iron production continues at 85 to 90 per cent of capacity; coke ovens, at 65 per cent. Coal ground stocks are dwindling and, aside from a little outside coke purchased, prospects for more fuel are dim. Plans have been completed at Koppers in Granite City, Ill., to bank both furnaces the first week of March unless coal flow resumes. The large local pig consumers have 3 to 5 months' supply on hand. An exception is Granite City Steel Co. which takes its iron in hot form.

Los Angeles—First effects of the coal strike have made themselves felt at western steel plants. Geneva Steel Co. has ordered a one-third curtailment of operations in its blast furnace, coke making, and open-hearth departments at Geneva and Ironton, Utah. Kaiser Steel Corp., has banked one of its two blast furnaces at Fontana, Calif.

San Francisco—Slack activity in foundries has increased inventories of foundry grades of pig iron substantially. Some imported iron is reaching the West Coast.

Seattle—Foundry operators report little improvement, operations being less than 50 per cent. Spring demand is expected soon. Metal is in good supply. No. 1 cupola cast is quoted $25-$27.50. Foreign pig iron is being freely offered about $7 under Geneva Steel Co.'s delivered prices.

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Scrap . . .

Scrap Prices, Page 112

Pittsburgh—Threat of drastic curtailment of steelmaking operations has forced almost complete cessation in scrap market activity. The market had recorded some strength in past few weeks due to increased consumption resulting from mills attempting to conserve dwindling coal inventories. The low level of steel operations is not expected to be of sufficient duration to drastically weaken scrap quotations, although purchases soon at $1 to $2 below current quotations are not improbable. One large mill purchased representative tonnage of short shoveling turnings last week at $25.

New York—Curtailed steel production, due to the coal strike plus adverse weather conditions, have reduced the movement of scrap. General undertone is strong, with brokers' buying prices on No. 1 heavy melting steel up 25 cents a ton to $20.50-$21.00. No. 1 cupola cast is higher at $25-$25.50. Charging box and heavy breakable cast are up 50 cents per ton to $25-$25.50.

Philadelphia—Curtailed production of pig iron, as a result of the coal strike, has stiffened the market on charging box and heavy breakable cast. Buying of charging box has been noted at $32-$33 and heavy breakable at $32-$34. Open-hearth grades of steel scrap are unchanged and firm. Early termination of the coal tie up might soon lead to higher prices.

Machine shop turnings are easier at $15.50; other grades of turnings are unchanged. Knuckles and couplers and steel car wheels are stronger at $29-$30.

Buffalo—Steelmaking scrap prices are steady as the coal strike keeps interest on both sides at a low ebb. Weaker tendencies are apparent in the cast market. Prices slipped an additional 50 cents to $1 a ton on cupola cast. Despite absence of sales, dealers show a willingness to do business in cupola at the reduced range of $30.50-$31.50 a ton with no takers reported.

Chicago—Higher scrap charge in open hearths and cupolas because of less plentiful pig iron supply is bolstering the market slightly. Although mills which are curtailing are taking scrap deliveries in restricted quantities, some prices have nudged upward. Machine shop turnings, mixed borings and cast iron borings are up $1 to $19.20. No. 1 cupola cast and stove plate are up 50 cents to $40.50-$41.50 and $31.50-$32.50, respectively. No. 1 railroad heavy melting is now $29-$30 and random length rails $33-$34. No. 2 bundles are easily available at $24. A tie-in sale of these with No. 1 bundles at a higher figure to one mill, while important tonnagewise, has not deterred other interests from accepting this price as the market value of the material.

Cincinnati—Scrap market is dull, reflecting mainly unsettled conditions due to coal shortage. Considerable tonnage is coming out including holdings of dealers. Little new consumer buying is noted.

Detroit—Despite such bearish factors as the coal miseries, the Chrysler strike and advent of severe win-

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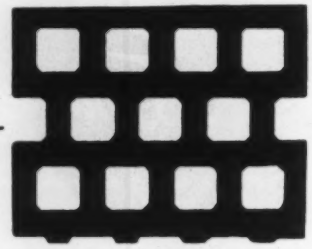

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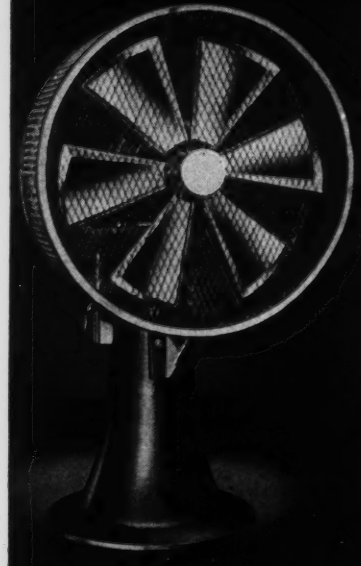

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ter weather, the scrap trade finds some buoyancy in fairly well sustained blast furnace operations and imminence of the next automotive lists, up for bidding this week. Ford has slowed blast furnaces, coke ovens and open hearths 20 per cent but other mill operations are on even keel. Prices are steady.

Cleveland—A strong undertone prevails in the scrap market for those items which are in heaviest demand including particularly those grades which are being used by blast furnaces and foundries. New commitments for heavy melting steel are lacking, prices holding unchanged at $28-$28.50, delivered.

Birmingham — Scrap is relatively weak in some grades notably heavy melting. Tennessee Coal, Iron & Railroad Co. is buying in comparatively small lots.

St. Louis—Scrap has become stagnant following limited purchases two weeks ago by the area's two biggest mill consumers. Shipments are tapering.

Los Angeles—Demand for scrap remains light. Possibility that mills will buy more scrap, if coal strike causes coke shortages, has reached the talking stage.

San Francisco—Demand is lethargic. Mills are buying selectively and only sufficient volume to maintain stockpiles. Prices are unchanged.

Seattle — Steel scrap market is quiet, supplies being ample for current needs. Mills are buying sparingly.

Canada . . .

Toronto, Ont.—Price controls have been discontinued on steel scrap in Canada. Mills continue to pay the former ceiling prices, but reductions may be made soon.

All that remains of wartime commodity controls are government regulations over the movement of steel and scrap to countries which are governed by communists or are located near communist countries. There still exists, in loose form, control over movement of steel between plants in Canada. About 25,000 tons monthly are moved in an attempt to make best use of Canada's total plant capacity. Interplant movement of steel is on a voluntary basis.

Pig iron production in December amounted to 172,002 net tons. For 1949, production made an all-time high record for Canada at 2,154,352 net tons. Ferroalloys produced in December amounted to 11,853 net tons.

Production of steel ingots and casting in December amounted to 263,949 net tons or daily average of 77.4 per cent of capacity and compares with 78.7 per cent for November and 87 per cent in December, 1948. The Dominion Bureau of Statistics shows a jump in Canada's rated capacity for steel ingots and castings from 3,792,000 net tons at the end of 1948 to 4,018,000 net tons.

California Approves Projects

San Francisco—Additional $48 million in new projects has been approved by the California Public Works Board. Construction is expected to get under way in the next three months.

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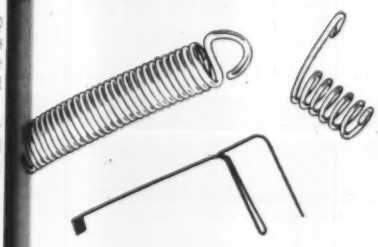
maybe so for most people ... but NOT for ACCURATE



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STRUCTURAL STEEL PLACED

1470 tons, four sections, Pennsylvania turnpike, Beaver county, through L. G. De Felice, general contractor, to American Bridge Co., Pittsburgh; section 29-D, 302 tons; section 29-E, 768 tons; section 30-A, 152 tons; and section 30-B, 248 tons.

1335 tons, power station addition, Riverville, Va., to Ingalls Iron Works, Birmingham, Ala.

1300 tons, DuPont plant, Pisgah Forest, near Asheville, N. C., to Bethlehem Fabricators Inc., Bethlehem, Pa.

545 tons, mill building, 137-A, American Cyanamid Co., Pearl River, N. J., to Bethlehem Steel Co.

430 tons, state bridge, Orange county, New York, through Shanahan Construction Co., to Pine Brook Iron Works, Scranton, Pa.

415 tons, new calendar and finishing mill, International Paper Co., Palmer, N. Y., to Lackawanna Steel Construction Co., Buffalo.

325 tons, White Plains Hospital, White Plains, N. Y., to Grand Iron Works Inc., New York.

280 tons, nurses home, St. Lukes Hospital, Bethlehem, Pa., to Bethlehem Contracting Co., that city.

280 tons, 2-story building, H. L. Green Co. Inc., Columbus, O., to Fort Pitt Bridge Works, Pittsburgh, Pa.

275 tons, elementary school, Upper Darby, Pa., to Robinson Steel Co., Philadelphia.

235 tons, factory building, Franklin, Va., through Merritt-Chapman & Scott Corp., New York, to Richmond Structural Steel Co., Richmond, Va.

210 tons, Ewing High School, Trenton, N. J., area, reported placed with Dayton Metal Products Co., Bronx, New York.

200 tons, addition, East Rockaway High School, East Rockaway, N. Y., through Berman Construction Co., general contractor, to the Elizabeth Iron Works, Elizabeth, N. J.

200 tons, warehouse addition, Hill-Chase Co., Philadelphia, to Cantley & Co., that city.

200 tons, state highway bridges, Uxbridge, Mass., to Bethlehem Steel Co. through S. & M. Construction Co., Boston.

140 tons, Pennsylvania railroad bridge, Broadacre, O., to Morris Wheeler & Co., Philadelphia.

135 tons, state highway bridge, Danvers, Mass., to Grosser & Shlager Iron Works, Somerville, Mass., through C. C. Smith Co., Watertown, Mass.

125 tons, state highway bridge, Lincoln, Mass., to West End Iron Works, Boston.

STRUCTURAL STEEL PENDING

6270 tons, state Foster Street bridge, Harrisburg, Pa.; bids Mar. 17.

2700 tons, Pennsylvania state bridge work, Valley Forge Expressway; bids Mar. 3.

1550 tons, approaches and rebuilding Washington state Longview bridge; bids to Olympia, Mar. 7.

1027 tons, bridge work, state turnpike commission, Allegheny county, Pennsylvania, bids Mar. 14. Work comprises 505 tons sec 30-C and 522 tons, sec 30-D.

1000 tons, Warwick apartments, Atlantic City, N. J.; bids Feb. 28.

915 tons, two stringer bridges and approaches, Sullivan Square, Boston-Somerville, Mass.

555 tons, structural steel H-piles, Navy purchasing office, Washington, for Norfolk, Va.; bids in Feb. 20.

500 tons, warehouse Penn Mutual Life Insurance Co., Philadelphia; bids closed Feb. 23.

400 tons, Washington state Metaline Falls bridge; general contract awarded to Henry Hagman, Cashmere, Wash., low $548,360.

400 tons, Woolworth store, Wilkes-Barre, Pa.; bids asked.

200 tons, rebuilding of state Street bridge, Luzerne county, Pennsylvania; bids Mar. 3.

150 tons, Lind Coulee bridge, (also 60 tons reinforcing bars); David Nygren, Seattle, low $151,691 to Bureau of Reclamation, Denver.

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"STRAIGHT-LINE"
TEMPERATURE CONTROL
with
XACTLINE

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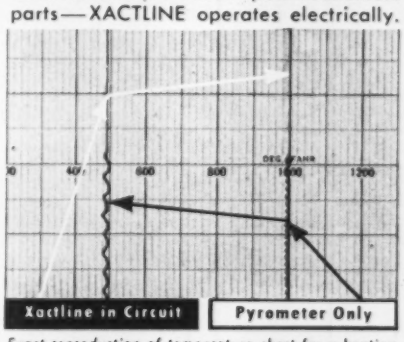
Undershooting

Are you going to continue to put up with that troublesome overshooting and undershooting inherent in your conventional pyrometer control — especially when it is so easy to eliminate that saw-tooth effect?

Put XACTLINE in the control circuit. XACTLINE anticipates the temperature changes — before they occur. And too, it nullifies the varying amounts of thermal lag, residual heat, and mechanical lag — producing a short on-off cycle resulting in "Straight-Line" temperature control. This performance is possible because there is no dependence upon mechanical parts — XACTLINE operates electrically.



Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight-Line" temperature control produced by XACTLINE and the saw-tooth curve obtained with only conventional control.

XACTLINE is applicable to any indicating or recording pyrometer control of the millivoltmeter or potentiometer type. It should be used wherever close temperature control is required — any type of electrically heated oven, furnace, kiln, injection molding machine, and fuel-fired furnaces equipped with motor-operated or solenoid valves.

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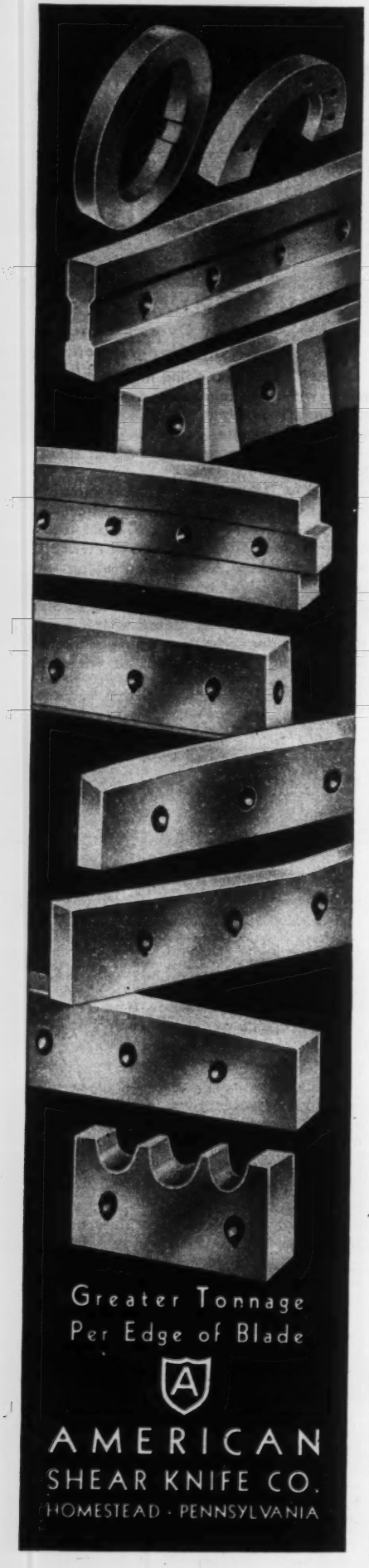

140 tons, Cedar river bridge, King county, Washington; bids in Feb. 20.

125 tons, reconstruction swing span bridge, Bonneville dam; bids opened by U. S. Engineer, Feb. 21.

120 tons, state C. W. Cullen bridge, Sussex county, Delaware; bids Mar. 15.

115 tons, state bridge, Bergen county, New Jersey; bids Mar. 2.

100 tons, gymnasium, Wilkes-Barre, Pa.; Sordoni Construction Co., low on general contract.

100 tons, state highway bridge, Berkley, Mass.

Unstated, miscellaneous items steel roof framing and crane runway, Canyon Ferry project, Montana; bids to Bureau of Reclamation, Denver, March 14; spec. No. 2919.

Unstated, various steel items, radial gates, hoists, etc., also 150,000-gal steel storage tank, Missouri river basin project; bids to Bureau of Reclamation, Denver, March-April.

REINFORCING BARS . . .

REINFORCING BARS PLACED

950 tons, state bridges and highway, Reading-Woburn and Burlington, Mass., to Bethlehem Steel Co.; Lane Construction Co., Meriden, Conn., general contractor.

580 tons, building, Admiral Corp., Chicago, to Joseph T. Ryerson & Son Inc., that city.

320 tons, Maytag Co., Newton, Iowa, to Pittsburgh Des Moines Steel Co., Pittsburgh.

313 tons, building, Gary, Ind., Budd Co., to United States Steel Supply Co., Chicago.

200 tons, Frederick & Nelson department store addition, Seattle, to Northwest Steel Rolling Mills Inc., Seattle; Henrik Valle Co. Inc., general contractor.

200 tons, miscellaneous projects in small tonnages, to Bethlehem Pacific Coast Steel Corp., Seattle.

196 tons, store, J. C. Penny Co., Chicago, to Joseph T. Ryerson & Son Inc., that city.

112 tons, diesel service building, Bensenville, Ill., Milwaukee road, to Joseph T. Ryerson & Son Inc., Chicago.

REINFORCING BARS PENDING

570 tons, building, Joliet, Ill., Blockson Chemical Co.; bids asked.

460 tons, apartment building, Sheridan road, Chicago; bids asked.

430 tons, flood protection, Ashland, Ky.; bids asked.

250 tons, rebuilding Washington state Longview bridge; bids to Olympia, Mar. 7.

165 tons, Washington State Metaline Falls bridge; general contract to Henry Hagman, Cashmere, Wash., low $548,360.

150 tons, building, Standard Oil Co. of Ohio, Cleveland; bids asked.

115 tons, four Washington state bridges, Douglas county; bids to Olympia, Mar. 7.

110 tons, Church of the Epiphany, Cnicago; bids asked.

100 tons, division headquarters, Ephrata, Wash.; bids to Bureau of Reclamation, Feb. 28.

Unstated, 13-story reinforced concrete apartment structure, Spokane, Wash., planned by Henry George, general contractor.

Unstated, 6-story addition to Sacred Heart hospital, Eugene, Oreg.; L. H. Hoffman, Portland, Oreg., reported low $769,915.

PLATES . . .

PLATES PLACED

150 tons, H-piling, Bellingham, Wash., school project to Bethlehem Pacific Coast Steel Corp., Seattle; Manson Construction & Engineering Co., Seattle, general contractor.

PLATES PENDING

100 tons plus, tanks for plant additions Hooker Electro-Chemical Co., Tacoma, Wash.; awards soon.

100 tons, penstocks for California-Oregon Power Co., Yamsey, Oreg.; bids in.

100 tons, 300,000-gal water storage tank; bids to city clerk, Kennewick, Wash., Mar. 7.

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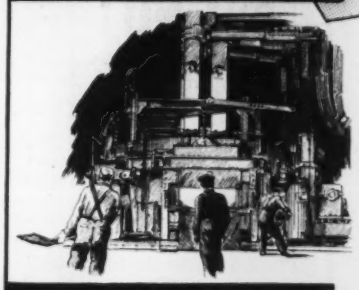
AND HERE . . .



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Baker's Magdolite, the *original* dead-burned dolomite, should be your choice because it assures you of *minimum* maintenance and repairs. Write for complete information. *The J. E. Baker Company, York, Pennsylvania.* Plants: Billmeyer, Pa., and Millersville, Ohio.

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61 YEARS OF SERVICE

Unstated, various plant additions at Atomic Energy Commission project, Richland, Wash.; no details released.

PIPE . . .

CAST IRON PIPE PLACED

2700 tons, 36-in. cast iron pipe, Metropolitan District Commission, Lynn, Mass., to Warren Pipe & Foundry Co., Phillipsburg, N. J.

135 tons, 16 and 12 in. for Kennewick, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

100 tons plus, 15,000 ft 6 and 4 in., King county, Washington, district No. 61; bids in to Parker & Hill, Seattle engineers.

STEEL PIPE PENDING

Unstated, 5600 ft 10-in.; bids Mar. 7 to W. P. Moulton, secretary, East Wenatchee, Wash.; G. D. Hall and Associates, Yakima, Wash., engineers.

Unstated, 13,060 ft small diameter steel pipe; bids in to U. S. Engineer, Seattle, Feb. 21.

RAILS, CARS . . .

RAILS PLACED

10,640 tons, 115 lb and 133.4 lb rails; also 2000 tons plus, tie plates, joint bars, bolts and spikes, relocation Spokane, Portland & Seattle and Union Pacific railroads, McNary dam project, to Colorado Fuel & Iron Corp., Denver, bidding $793,014 and $369,243, respectively, to U. S. Engineer, Walla Walla, Wash.

Atlantic Coast Line, 50,000 tons of rails, to Tennessee Coal, Iron & Railroad Co.

Bessemer & Lake Erie, 3450 tons of rails, to Carnegie-Illinois Steel Corp.

Delaware & Hudson, 3915 tons of rails, to Bethlehem Steel Co.

Richmond, Fredericksburg & Potomac, 8000 tons of rails, to Bethlehem Steel Co.

LOCOMOTIVES PLACED

Cincinnati Union Terminal, two 750 hp diesel-electric switchers, to Lima-Hamilton Corp., Lima, O.

Union Pacific, twenty-five 1200 hp diesel-electric terminal switch engines and ten 2250 hp diesel-electric passenger units, to Electro-Motive Division, General Motors Corp., LaGrange, Ill.

FERROALLOYS

(*Continued from Page* 109)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. And 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk, 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls,

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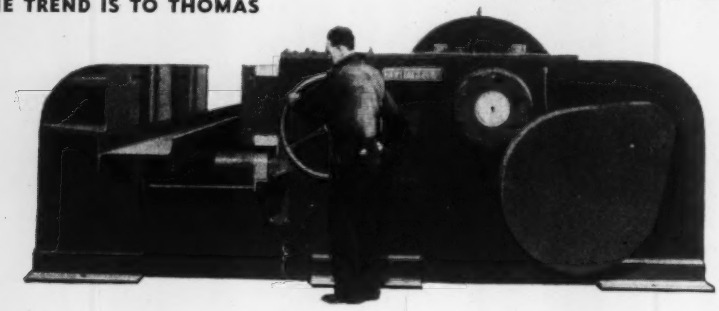

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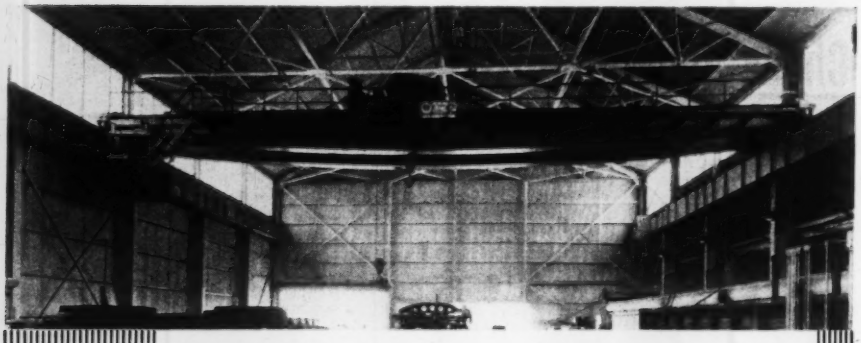

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Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained

Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb. less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed. 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ⅛" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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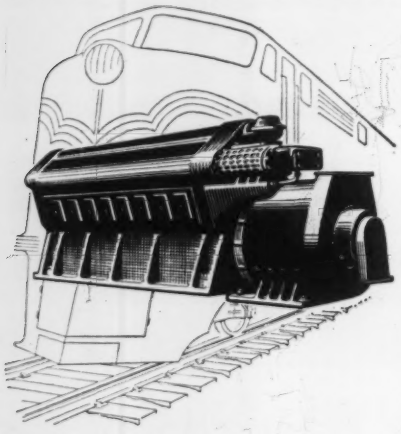

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

Construction work has started on a new branch building at 1165 Kinnear Rd., Columbus, O., for **Massey-Harris Co.**, Racine, Wis. F. C. Knight is manager of the Columbus branch.

Braun Bros. Packing Co., Troy, O., will build a packing plant there to cost more than $1 million. If bids for the general contract are "satisfactory," construction will begin this year.

Arkansas Valley Electric Co-operative Corp. plans a steam generating plant near Ozark, Ark., to cost $9,565,000. W. M. Milton is manager.

Fillauer Surgical Supply Co., Chattanooga, Tenn., received bids Feb. 21 for a new building.

Columbia Gas System, Wilmington, Del., plans a $27 million expansion program. Stuart M. Crocker is president.

Pennsylvania Power & Light Co., Allentown, Pa., plans to spend $28 million on new developments this year.

Lockheed Aircraft Corp. will construct a $300,000 addition to its plant at Burbank, Calif., to house $2 million worth of aircraft manufacturing equipment.

Johnson & Johnson—surgical dressings—will build a laboratory building and an administration building in which to consolidate and expand its research activities in New Brunswick, N. J. Alexander P. Morgan, New York, is the architect; Guy B. Panero, mechanical engineer; Strobel & Salzman, structural engineer; John W. Ryan Construction Co., builder.

Twenty-six new hospitals and six additions to existing **Veterans Administration** hospitals are scheduled for completion this year. Two 500-bed hospitals, at Cincinnati and Salt Lake City, Utah, and a 500-bed addition to the existing hospital at Jefferson Barracks, Missouri, have been advertised for bids.

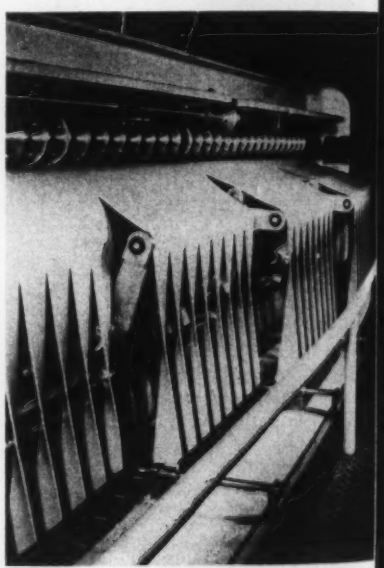
Imperial Oil Ltd. awarded a contract for construction of a refinery in Winnipeg, Man., to **Canadian Kellogg Ltd.**, subsidiary of **M. W. Kellogg Co.**, refinery and chemical engineer, Jersey City, N. J.

Tellepsen Construction Co. Inc., Houston, was awarded a general contract for a plant to be constructed by **Galveston Wharves Inc.** and leased to **Lipton Tea Co.** Subcontractors include: **Mosher Steel Co.**, Houston, structural steel; **Contractors Material Co.**, Jackson, Miss., reinforcing steel; **A. J. Warren Co.**, Galveston, Tex., plumbing, heating, ventilating and air conditioning.

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., established an integrated building products department to handle national sales of all Kaiser aluminum specialty products that go primarily into homes and commercial and farm construction.

Louis Allis Co. Milwaukee—electric motors—pooled its engineering skill with Foote Bros. Gear & Machine Corp., Chicago, to produce a new line of gear motors. The new product is a compact power unit in which shaft speeds have been reduced in proportion to motor speeds through a new series of gears. It produces a power unit turning at the right speed for any job.

Plans are being completed by Eberle M. Smith Associates Inc., Detroit architect, for construction of a $2 million addition to the Union building at the **University of Michigan,** Ann Arbor.



ANY WAY YOU SLICE IT: Kraft Foods Co. developed a new kind of machinery that produces cheese in slices of uniform flavor, texture and quality. Here you see cheese being sliced into three-inch wide strips just after being pasteurized. Run over a chilled rotating drum the cheese emerges as a sheet an eighth of an inch thick

Anchor Post Products Inc., Baltimore—wire fence, gates, oil burners—is erecting a one-story warehouse, 80 x 80 feet. William F. Brannan is president.

Carborundum Co., Niagara Falls, N. Y., started production of Carborundum silicon carbide in a new plant in Vancouver, Wash. It is located on a 99-acre site and cost over $2 million. Its output augments that of similar plants of Carborundum located in Niagara Falls, Quebec, Ontario, and Norway

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